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*Illustrated.

The governor of New York, in a number of important appointments which he has had to make recently, has aimed chiefly to satisfy his party, or one or other of its factions, and thus has neglected the high duty of selecting the men best fitted for the several places. James E. Sague, public service commissioner for the Second district, has been pushed aside for a new man, whose distinctive merit is that he is a democrat. Mr. Sague, appointed by Governor Hughes in 1907, is a mechanical engineer and a man of long railroad experience; and in addition to this is now a public servant of six years' experience. Moreover, his record as commissioner has been highly creditable. From the standpoint of knowledge and skill in dealing with questions of railroad operation he is the ablest public officer in the United States, either state or federal. But all of this counts for nothing against party expediency. The new commissioner appointed in place of Mr. Douglas is professor of law in Cornell University. This appointment evidently is on a higher plane than one which is made to hang wholly on political considerations, but there is still the total ignoring of the value of experience in the office. Railroad commissioners have to be educated by the state (after they take office) at great expense; but this is a consideration to which the appointing powers seem everywhere to be lamentably blind.

Public Interest Ignored by Governor

No article published in these columns recently has emphasized more strongly the necessity of the engineer studying closely operating conditions before undertaking the design of a particular structure than that in this issue on the Design of L. C. L. Freight Houses, by E. H. Lee. It is axiomatic that any plant must be designed with a view to its economical operation, but a casual investigation will show that this phase of the subject is not always considered as carefully as it should be. As a result of studies such as that made by Mr. Lee, an engineer is not only placed in a position to design his structure to the best advantage, but frequently he is enabled to develop improved methods of operation in connection with his design These studies, therefore, are valuable from the operating as well as the engineering standpoint. This article also emphasizes the importance of L. C. L. freight service and the influence the design of the station bears to its economical operation in an already very expensive service. This problem will become of increasing importance within the next few years, for the development in the design and operation of freight houses has not kept pace with that in other branches of terminal development. L. C. Fritch sounded a note of warning about a year ago, when he deprecated the large expenditures for passenger terminals to the detriment of the freight facilities. Developments in the handling of L. C. L. freight have been relatively few within recent years. It is true that motor trucks, telphers, and other forms of mechanical equipment have assisted materially in reducing the cost of handling freight in special locations, but Mr. Lee shows, in the article referred to, that these savings may be relatively small compared with the high fixed and other charges. When the fixed charges for land alone amount to $1.07 per ton, as in one case cited by Mr. Lee, and when the cost of trucking increases $0.01 per ton for every 35 ft. increase in the length of the freight house, the importance of designing the structure so that all space may be utilized to the best advantage is evident. There is a wide field for study and improvement in the design of freight houses to handle freight more expeditiously and with a minimum amount of handling, and also in the methods of handling the freight to reduce these terminal charges to the minimum. There are few more promising fields for real improvement in railway operation at the present time than here.

Studies of Freight House Design

AMERICAN TELEPHONE & TELEGRAPH COMPANY

THE annual report of the American Telephone & Telegraph Company for the calendar year 1913 is intended to be and is an exhaustive argument in favor of private ownership of a public service utility which in its very nature is a monopoly. The report may be resolved into two interwoven methods of argument—one, the masterly marshaling of facts, and the other, a remarkably sound treatise on economics. To those who are interested in the economics of public service management and operation—and railroad men should be deeply interested in this question—Mr. Vail's report is recommended as both profitable and interesting reading.

There are only five one hundred million dollar railroad companies in the United States; but the Bell telephone system, which includes the American Telephone & Telegraph Company and its associated holding and operating companies in the United States, but does not include the connecting independent or sublicensee companies, nor the Western Electric nor Western Union, with all duplicating accounts excluded, earned gross in 1913 $215,570,000, which is greater than the earnings in 1912 by $16,400,000. Operating expenses amounted to $156,880,000, an increase over 1912 of $14,600,000, leaving net earnings of $58,690,000 in 1913, as against $56,890,00 in 1912. The total net capital obligations outstanding in the hands of the public at the end of 1913 were $724,350,000.

The telephone plant itself, exclusive of current assets, is carried on the books of the company at a cost value of $797,160,000. In regard to the American Telephone & Telegraph Company itself, it is pointed out that for the $344,620,000 stock (par value) outstanding there has been actually paid into the treasury of the company $369,140,000.

Space permits of citing only a few of the most striking figures showing the magnitude of the business of the Bell system of telephones. The total number of subscribers' stations at the end of 1913 was 8,130,000, and toll stations now reach 70,000 places. The daily average toll connections last year was 806,000, and exchange connections, 26,431,000. This is a total of about 8,770,000,000 connections per year. The total mileage of wire used in exchange and toll service was 16,110,000; additions made during 1913 totaling 1,500,000 miles.

The somewhat unsatisfactory unit for comparisons of telephone costs and business is the exchange station. In 1913 the total earnings of the Bell system per exchange station were $39.48, as compared with $40.14 in 1912, and the operating ratio, taxes being included with expenses, was 78.6 per cent. as against 76.9 per cent. in the previous year. Since 1895 there has been a steady increase in the number of exchange stations, varying from 8 to 9 per cent. per year. The average plant cost per exchange station, including exchange and toll construction, was $141 in 1913, $143 in 1912, and about $260 in 1895. The average cost per mile of wire, including poles and conduits, was $70 in the year 1913.

The contention of Mr. Vail throughout the annual report is that efficient and adequate service to the public go hand in hand with progressive and successful private management under public regulation. Some of the facts upon which this argument is based deserve mention. During the period from 1907 to 1913 gross earnings of the Bell system increased from $128,580,000 to $215,570,000—$87,000,000; operating expenses, including taxes, have increased from $87,400,000 to $156,880,000—$69,500,000; interest charges have increased from $10,500,000 to $16,600,000—$6,100,000; total assets have increased from $613,100,000 to $980,000,000—$367,000,000. With the increase of $367,000,000 in assets, the capital obligations and accounts payable outstanding have increased but $245,000,000, while the surplus and reserves have advanced from $61,300,000 to $174,500,000, an increase of $113,000,000.

In the United States the post office is operated by the government and the telephone and telegraph lines by private companies. In Europe both the post office and telephone and telegraph lines are in general operated by the government. The following table makes, therefore, an interesting comparison:

	Europe		United States	
Type of message	Number during 1912	Per cent. of total Europe	Number during 1912	Per cent. of total U. S.
First class mail matter.	17,775,000,000	71.2	10,212,000,000	39.4
Telegrams	338,000,000	1.5	113,000,000	0.4
Telephone conversations	6,809,000,000	27.3	15,600,000,000	60.2
Total	24,972,000,000	100.0	25,925,000,000	100.0

No better summing up of the situation can be made than the following quotation from Mr. Vail's remarks: "The soundness of any policy, the 'efficiency' and 'sufficiency' and the reasonableness of charges for the use of any utility, are ultimately determined by the degree of its adoption by the public. In the United States there are 9.7 stations to reach 100 population, more than double that of any other country, nearly six times that of Great Britain, over thirteen times that of France, more than four times that of Switzerland."

A CONTEST ON YARD OPERATION

THE efficiency of a railroad is largely determined by the operation of its yards. The average daily movement of a freight car is about 24 miles, and it has never exceeded 26 miles for any one month, taking the country as a whole. Assuming an average speed on the road of 10 miles per hour, this means that the average car is moving only 2½ hours daily. While these figures include all cars in shops and repair yards, as well as surplus cars in storage, L. F. Loree has estimated that the average daily delay to cars in yards is 10 h. 32 min.

The problem of increasing the movement of cars is, therefore, not primarily one of increased supervision on the line or of operating trains at higher speed, but rather one of reducing the time spent by the cars in yards. James J. Hill has frequently emphasized the importance of the construction of larger terminals to eliminate the continually recurring periods of acute congestion of traffic. Larger terminals are urgently needed, and these conditions of congestion and consequent car shortage will never be permanently relieved until the additional facilities are provided. However, the most important problem is the efficient operation of the existing facilities.

The superintendents of terminals, the trainmasters and the yardmasters are the officers upon whom the solution of the problem directly devolves, and these officers can do more to increase the car mileage and thereby the efficiency of operation of the road than any other set of officers today. It is more than a coincidence that the Burlington, which has made an unusual record for efficiency in recent years, has an average car movement of over 32 miles per day, and that this figure has gone as high as 35.6 miles for individual months. Also, the most important feature contributing to the wonderful operating results secured by the Pittsburgh & Lake Erie is the location and the method of operation of its yards.

In general, yards may be divided between those designed for the assembling and breaking up of trains for forwarding to the next terminal, and those designed essentially for the collection and distribution of freight to industries, connecting lines and freight houses. In some instances, one yard serves both these purposes, but in most yards work of one or the other class is greatly preponderant. In many ways the problems are different.

Because of the magnitude and urgency of the problem of yard operation, we announce a contest on "The Operation of Classification Yards" as distinguished from the more strictly termed terminal yard. Within the limits of this contest will be included discussions of the best methods of operating classification yards with descriptions of methods already worked out and suggestions for the improvement of existing methods. It will include the classification and breaking up of trains; means for the reduction of delays to cars, terminal overtime and switch engine mileage; the separation and handling of special traffic,

such as time freight, etc., the handling and repairing of bad order cars, the prevention and breaking up of blockades, and, in fact, all the various problems connected with the operation of such a terminal.

We offer prizes of $50 and $35, respectively, for the two best papers received, and will pay our regular space rates for all others accepted and published. All contributions should be plainly marked, "Contest on Yard Operation," and should be sent to the editor of the *Railway Age Gazette*, 608 South Dearborn street, Chicago, to be received not later than June 1, 1914.

"PADDING" THE FAMILY MAINTENANCE ACCOUNT!

THE chairman of that judicial body, the Iowa State Railroad Commission, who is now before the Interstate Commerce Commission as the representative of the American Live Stock Association and the National Council of the Grain Dealers' Association in opposition to the 5 per cent. increase in rates, is, as the readers of the *Railway Age Gazette* already know, not only a man of extraordinarily judicial temperament but also a marvelous statistician. One cannot soon forget his curious demonstration, by statistics which were not so, of the ease with which the government could absorb the railways.

But Mr. Thorne's latest effort surpasses anything heretofore conceived of. Assuming that railroad revenues are a tax—and any one who knows Mr. Thorne knows that assumption is as simple to him as breathing—he takes the total revenues of the railways of the United States for 1913, secures with the aid of the director of the United States Census the total number of families in the United States, and by dividing the latter into the former reaches the result that the railroad tax per family is $141.69. Then, having decided that the "annual wage of the average man" is $600 per year, he reaches the obvious and distressing conclusion that a man works almost three months of every year to pay his railroad tax. Then, turning triumphantly to the commission he gives utterance to this touching plea: "I claim that any tax which compels the average man to labor annually almost three months is of tremendous and vital importance, and any attempt to make any substantial increase in that tax will not be tolerated by the rank and file of the country until it is fully and fairly justified."

With a thorough appreciation of the mental profundity of this statistical expert we may venture tremblingly to suggest a few points that have possibly been overlooked. The average wage here quoted, if at all correct, which is doubtful, refers to the individual man and not to the family; it refers to the income of wage earners and not to income receivers as a whole. Moreover, the railroad revenues used by Mr. Thorne in his computation have not reached their final destination. The railroad is a distributor of this income received, and nearly all of it goes back into the pockets of individuals as wages.

But we may leave these points out of consideration, just as Mr. Thorne did. Let us rather consider a few other of the burdens which this $600 average man must bear. The cost of government, national, state, and municipal, in 1913 approximated $2,827,000,000 for 21,577,173 families. This was equivalent to $131 per family and its head must labor for two months and a half to pay for it. According to an exhibit prepared by the American Federation of Sex Hygiene the bill for intoxicating liquors and tobacco in the United States is $3,200,000,000. Another three months of our average man's year is gone beyond recall. Immorality and social diseases consumes $3,000,000,000 more of the tax payers' money; and so vanishes another three months of the time of the head of this most unfortunate average family. Turning to expenditures which may seem to the ordinary person to be more necessary, we find that confectionery, soft drinks, tea and coffee, patent medicines, chewing gum and jewelry are estimated to consume over $1,300,000,000 of our hard earned income. Another three weeks of our average man's time has slipped by. The year has vanished and no food or clothes or means of paying the house rent have yet found their way into this sadly troubled home! Not to mention the complete want of food, raiment and shelter the members of the family are still waiting for father to contribute his share of the annual automobile bill and a host of other claims crowding upon him thick and fast. The end is clear from the beginning. The average man and his family, dead from starvation, and exposure, lie buried under a mountain of unextinguished debt!

Is there not a fellowship available for Mr. Thorne in the Royal Statistical Institute? Surely such talents should not be buried in a napkin!

WHY CONTINUE TO LIBEL RAILWAY MANAGERS?

DOES it not occur to the public that it is about time for public opinion to call a halt on the practice being so freely indulged in of imputing dishonorable motives and crooked methods to railway managers every time any important question affecting the railways is raised?

It is known and conceded by all persons who have made a study of transportation affairs that there has been a remarkable improvement in conditions and practices in the railway business in this country during the last decade. It is also known and conceded that there has been a great change and improvement in the attitude of railway financiers and executive officers, and even in their personal characters. There are no concerns in the country all of the details of whose transactions are laid so open to the public eye or that are so sharply scrutinized as the details of the business of the railways, and probably there is no class of concerns whose affairs would stand scrutiny as well as those of the railways have. Why, then, should public opinion condone, and even encourage, the spreading abroad of malicious generalities which imply the existence of conditions in the railway business which do not exist and which cast aspersions on the honor of railway managers which are wholly unjust?

The question of the propriety of certain relations which have existed between the railways and the industrial railways has been injected into the rate advance case. Some of the facts regarding these relations recently have been widely published. In consequence, the charge has been made that the railroads have continued up to the present time to give rebates to big shippers, and this has been made the basis for sharp condemnation of their managements. Now, as has repeatedly been pointed out, the railways and the shippers, especially the United States Steel Corporation and its subsidiaries, voluntarily went to the commission, laid the facts regarding these matters before it, and asked it to make an investigation and tell the railways and the shippers what they ought to do to establish relations which would be proper and legal. Did this action indicate a disposition on the part of either the shippers or the railways to act in disregard of public opinion and to violate the law? If they deserve condemnation for what they had done before, did they not merit commendation for the steps taken by them to improve the situation?

Again, consider the imputations and aspersions that are being thrown about because of increases which formerly took place, and decreases which more recently have been made, in the operating expenses of eastern roads. In the fiscal year 1910, and again in the fiscal year 1913, the roads had increases in their gross business. It would be a sorry state of affairs if when the traffic being handled increased there was not an accompanying increase in expenditures for maintenance. For, first, the more business there is handled the larger expenditures for maintenance must be if the properties are to be kept up; and second, the more business there is handled the larger the gross earnings are and the more the roads can afford to spend for maintenance. Nevertheless, as these increases in business and therefore in maintenance expenses have happened to occur when the railways were asking for increases in rates, they have been

made the basis of imputations, and even of direct charges, that the railways have padded their maintenance expenses in order artificially to increase their operating expenses and thereby more effectively convince the Interstate Commerce Commission that they need higher rates. Immediately following the close of the fiscal year 1910 and the fiscal year 1913 there were declines in traffic; and there has been a very heavy decline in traffic within recent months. In consequence the railways, including those in eastern territory, have been reducing expenses in many ways. This has involved the laying off of men, and now an attempt is being made by malignant and hypocritical innuendo to give the public the impression that thousands of men are being discharged for the purpose of influencing public opinion and the Interstate Commerce Commission regarding the rate question.

In other words, when business increases and the railways increase their maintenance expenses they are charged with "padding" them. When business falls off and the railways reduce their operating expenses they are charged with throwing men out of employment to influence public opinion and the deliberations of the commission.

All these imputations, innuendoes, and charges reflect upon the good faith of the railway managers of America. Now, beyond question there are some railway managers whose conduct is not of the most exemplary character, just as there are men in every other business whose conduct does not place them above criticism. But can it be that the public believes that there is right or justice in constantly imputing dishonest motives and improper methods to men such as, for example, Daniel Willard, president of the Baltimore & Ohio; Samuel Rea, president of the Pennsylvania, and others who are actively leading the struggle of the eastern railways for higher freight rates? Can any one point to any three business men in the United States who have cleaner records and more unblemished characters than Daniel Willard, Samuel Rea and F. A. Delano, who have, perhaps, been most active in pressing the case of the eastern roads? Have we got to a place in this country when any little squirt of a demagogue who constitutes himself a tribune of the people—while, perhaps, in the pay of shippers—can throw mud at such men and make it stick?

It may be said that the thing to be considered is not the character or the motives of railway managers, but the facts. Very well, let us stick to the facts then, and quit trying to damn clean, high-minded, public-spirited business men by mere implication. The railway managers have told the commission what they think the railways ought to have. They have presented tons of documentary evidence in support of their claims. No man but a fool or a knave doubts that Mr. Willard, Mr. Delano and others who have appeared before the commission are honest in contending that the railways need larger net revenue. If other persons do not accept their view let them attack the showing made by the railways and introduce evidence to show that the roads do not need higher rates. The Interstate Commerce Commission, it is assumed, is competent, after the facts have been presented to it by all concerned, to reach a fair and intelligent conclusion; and to assume that it is going to be influenced in its decision by manipulation of the accounts of the railways, by the unnecessary discharge of employees, or by aspersions on the honor and methods of railway managers, is an insult to the commission.

While cartloads of data, some of them relevant and much of them irrelevant, are presented to the commission, while the lawyers make long speeches, and the commission deliberates, the business of the country halts and other business concerns besides railways add to the number of unemployed men. That the general business situation is being affected more profoundly by the railway situation than by any other thing, all business men concede. Is the condition of the railway business and of business in general going to be improved by the continued exercise of the ingenuity of certain persons in inventing new libels of railways and railway managements, and by the continued activity of the newspapers in giving widespread publicity to those libels?

Letters to the Editor

SIMPLIFICATION OF RATE SCHEDULES

London, Eng., February 4, 1914.

To the Editor of the Railway Age Gazette:

Anything that Mr. Prouty says on the subject of railway rates is naturally and properly accepted as authoritative. I think, however, that his statement as to German freight tariffs (which would certainly not convey the real facts to an ordinary reader) deserves a somewhat more detailed correction than that given in your editorial note of January 23.

It is quite true that there is a "comparatively small volume containing the rates of the German railroads." But to say that it contains all those rates is really about as correct as to say that a Pennsylvania folder contains the whole passenger train service of the United States.

In the *Zeitung des Vereins deutscher Eisenbahnverwaltungen* of October 14, 1904, there is an article by a German railway official, Herr Lüttke, dealing very fully with the subject. The author speaks of "the existing welter of tariffs and 'supplemental tariffs,'" and he recognizes the justice of the complaints of traders—which at the time were loud in the technical journals—in reference to "the difficulties which traders under the existing system of tariff records have in ascertaining any specific rates with ease and certainty." He goes on to point out the advantage of making for Germany what he acknowledges does not exist, a complete collection of railway tariffs such as exist in some other countries. What the collection would mean he shows by examples. The French publication—known as *Chaix*—is, he says, by no means complete. It only gives the more important rates and conditions; yet it occupies 2,700 quarto pages of small print and weighs 14 lb. avoirdupois. The Austrian railways, also continues Herr Lüttke [Austrian only, not Austro-Hungarian], do publish a complete collection of all their tariffs, which may be regarded as the pattern of what such a book should be. It is divided into fourteen parts, occupies 6,000 pages, and weighs 32 lb. A German collection would, he says, need to be vastly bigger than the Austrian. Germany has four times as many stations. The tariffs referring to the international traffic between Germany and Austro-Hungary would alone require some 3,000 to 4,000 pages. "In any case, as a glance at the tariff record of the German Imperial Railway office shows, a compilation of the tariffs in which Germany is interested, even if the transit tariffs were omitted, implies not a book but a library."

One quotation more from Herr Lüttke:

> "It is safe to say that, with the exception of carrier firms, a few specially large businesses and the trade organizations and chambers of commerce, the helplessness of the ordinary German trader in handling the tariffs which he has to do with is astonishing. . . . The trading public are still afraid of losing their way in the difficult, confused and artificially ambiguous regulations and conditions in the tariffs, and accordingly they prefer to make [in each case] a special enquiry."

It is probably also safe to say that the tariffs of every country, Germany and the United States included, are unnecessarily complicated. It is obviously true that, if they could be simplified, it would be for the benefit of all parties. And personally, I am convinced that a great deal could be done in the direction of simplification. But, if the public get into their heads that simplification is an easy and straightforward task, and that it is nothing but railway obstinacy and stupidity which prevents them having the whole thing cut and dry in a comparatively small volume, easily intelligible to the average clerk, progress will not be helped but hindered. It is from that point of view that I ask you to allow me to contribute one small grain of fact. Mr. Prouty will, I am sure, not think that because I have ventured to correct—or, shall I say, amplify—his statement in one particular I undervalue his position as the master of us all in matters of freight rate regulation in general.

W. M. Acworth.

The Railways of the Argentine Republic*

Part Two. Government Regulation of the Argentine Railways; the Gage Question; Future Development

By F. Lavis
Consulting Engineer, New York

For the purpose of considering the general railway situation, the country may be divided into four parts, first the section to the south of Bahia Blanca, comprising the territories of Rio Negro, Chubut and Patagonia which have, up to the present, been almost entirely neglected, but which are said to have possibilities for agricultural development hitherto almost unsuspected, as well as considerable pine timber; second, the central section between Bahia Blanca on the south and Santa Fe and Cordoba on the north which, as will be seen from the railway map, is that in which the principal development has taken place up to the present; third, the northern section which has been tentatively explored around the edges at least and which probably will see a great development, both pastorally and agriculturally, within the next 25 years, and the fourth section, the provinces of Entre Rios and Corrientes with the territory of Misiones, cut off from the rest of the country by the Parana.

Plaza Constitucion Station of the Buenos Aires & Great Southern Railroad, Buenos Aires

BROAD-GAGE LINES

As will be seen from the tables of statistics, the most important of the Argentine railroads are the four British broad-gage lines, the Southern, Western, Pacific, and Central Argentine, all radiating from Buenos Aires and occupying more or less separate zones from the south around to the north in the order named. The Southern and Western, the two oldest roads in the country, occupying the southern half of the province of Buenos Aires, agreed about a year ago on a scheme of amalgamation which was ratified by their boards of directors and submitted to the government for approval. This latter, however, was long delayed, and in the meantime the province of Buenos Aires brought forward a project for an extensive system (2,485 miles) of competing narrow-gage lines to be built by the state, so the scheme was abandoned and the petition withdrawn. This seems unfortunate, as one of the provisions which had been required by the government, and which had been accepted by the railways, involved the construction of some 900 miles of new lines to properly link up the two systems and more adequately serve the territory they cover, which was more likely to have been built and which would have been far more beneficial to the community than the narrow-gage system proposed by the province.

The Buenos Aires Pacific runs almost due west from Buenos Aires to Mendoza at the foot of the Andes, where connection is made with the Transandine line to Chili. It also has a line, formerly the Bahia Blanca Northwestern, running southerly from San Luis to Bahia Blanca. The Central Argentine occupies the zone between the Pacific and the Parana river, reaching nearly all parts of the territory in the triangle between Buenos Aires, Cordoba and Santa Fe, with a single line from this latter city to Tucuman. The Buenos Aires stations of the Southern and Central Argentine Railways are illustrated, as well as the new four-track Scherzer rolling lift bridge on the main line of the Southern Railway at Buenos Aires. The double track brick arch viaduct over which the Pacific Railway enters Buenos Aires is also shown in one of the illustrations.

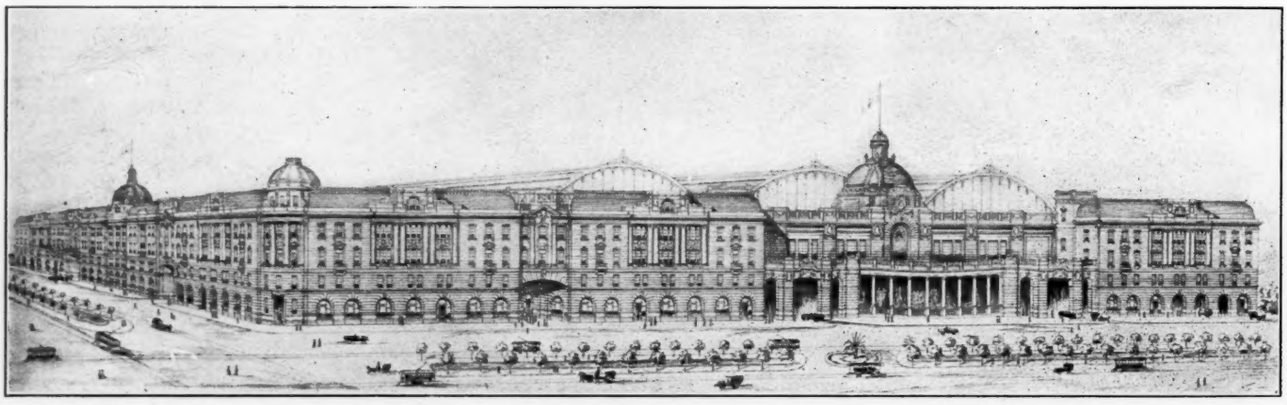
These broad-gage lines cover the richest, because most intensively developed, part of the Argentine; they are the oldest lines, and the development has naturally followed their extension. The first line in the Argentine was that between what is now the Plaza Once in Buenos Aires, the present terminus of the Western railway, and Flores, a suburb now part of the city. This was 6 km. in length, and was made 5 ft. 6 in. because, so the story goes, at the time of its construction about 1855, there was some second-hand railway material available that had been in

*Part One of Mr. Lavis' article was published in the *Railway Age Gazette* of March 27.

use in the Crimea during the war with Russia then just ended, and which had been diverted there from material destined originally for India, where the 5 ft. 6 in. gage was early adopted. Here, as in India, the bad effects of the adoption of a gage wider than is necessary are seen in the greater readiness with which the narrow gage is adopted because of its supposed economy. The writer has discussed the gage question, as it affects the Argentine and South America, quite extensively elsewhere,* so the matter will not be further alluded to here.

The other broad-gage line, the Rosario á Puerto Belgrano, was built by French interests a few years ago between Rosario and Bahia Blanca. It is a north and south line running along near the westerly edge of the province of Buenos Aires, cutting across all four of the other broad-gage systems. It is well built, but as it crosses the main flow of the trade which, as has been pointed out, is very largely to and from Buenos Aires, it does not do much business. Like many other schemes, notably among others the port of La Plata, which have been based on the theory that business could be diverted from Buenos Aires because of the congestion there and consequently higher cost of handling it, it has not been very successful.

This characteristic of many of the South and Central American countries, of bringing all the imports to one place, is perhaps more pronounced in the Argentine than elsewhere, and, while undoubtedly the ports of Rosario, Santa Fe and Bahia Blanca will continue to grow in importance, Buenos Aires will probably remain far ahead and maintain or quite likely increase its lead and its importance as the center from which the transportation systems must radiate and likewise increase.



New Station of the Central Argentine Railway, Buenos Aires

MEDIUM-GAGE LINES

The provinces of Entre Rios and Corrientes, within the confines of which are located the two principal medium-gage railways, are almost entirely surrounded by the rivers Parana and Uruguay. They are thus practically entirely cut off from communication with the rest of the Argentine, or indeed with any other part of the world, except by water transportation. Their isolated position, therefore, has rather retarded their development in spite of the richness of the lands in many parts, and the railways have been merely local lines from the interior to the small ports along the rivers.

About 1906, however, it was decided to effect a connection with the city of Buenos Aires by means of an extension of the line to Ibicuy and a car ferry across the delta of the Parana river to Zarate, a small town in the province of Buenos Aires. Here connection was made with the Central of Buenos Aires railway, then a rural steam tramway of medium gage, over which running rights were obtained into the city of Buenos Aires, though at a point a fairly long distance out from the center. This through line was opened to public service only about four years ago. This ferry route, nearly 50 miles in length, is one of the longest in the world; one of the boats, as well as the slip and transfer bridge, are illustrated. There are three of these ferry boats ready for service, all of approximately the same size, two of which cost $150,000 each, and the other one about $250,000. They each have a capacity of 800 ft. of available track, are about 290 ft. long and 58 ft. wide, drawing when fully loaded between 11 and 12 ft. One boat has a normal speed of 14 miles an hour, and has reached a maximum of 18 miles; the other two make from 10 to 12 miles per hour. On certain parts of the run, and at certain times of the year, these boats have to contend with a current running at a speed of 3 miles an hour.

About the same time also, the Central railroad of Paraguay, which at that time was a broad-gage line running from Asuncion, the capital of that country, to Villa Rica in the interior, was changed to medium gage and extended to Encarnacion, on the north bank of the Alto Parana river and opposite Posadas in Corrientes, and another car ferry established there, so that by means of these two car ferries through train service between the city of Buenos Aires and Asuncion, through the provinces of Entre Rios and Corrientes, is now possible, thus putting all this section in close touch with Buenos Aires and the outside world.

The Central of Buenos Aires is owned by the Lacroze family, which also controls some of the street-car lines of Buenos Aires. These latter connect directly with the railway and the street cars run over its lines, which are equipped with an ordinary overhead trolley wire, to the end of the suburban zone. When the Entre Rios connection was made, the track from Zarate was relaid with heavier rails to take care of the heavier rolling stock of the Entre Rios trains which are run through, but the general equipment of the road otherwise is very light.

NARROW-GAGE LINES

The narrow-gage lines of the Argentine have been principally developed in the section north of Rosario and Cordoba and, until within comparatively recent times, partook more of the character of small local lines than of a connected system of trunk lines, none of them having reached the national capital.

A few years ago, however (in 1908), some French capitalists built a narrow-gage line from Buenos Aires to Rosario and there connected with the lines of the much older French company operating the Province of Santa Fe Railway reaching to Resistencia at the confluence of the Paraguay and Alto Parana, and connecting at Santa Fe with the government lines through Tucuman to La Quiaca on the Bolivian border. From La Quiaca there is a short gap still remaining, which will probably be closed within the next year or so, and it will then be possible to run trains through from Buenos Aires to La Paz.

The Central Cordoba system, which had been formed by uniting some three or four small lines between Rosario, Cordoba and Tucuman, with headquarters at Cordoba, decided about this same time to build an extension to Buenos Aires from Rosario and thus connect its system with the national capital, this line being opened to public service only about a year and a half ago

*In a paper to be published shortly by the American Society of Civil Engineers.

and the headquarters of the system transferred to Buenos Aires. The Central Cordoba connects with the government lines at Cordoba and Tucuman.

The Argentine government lines in the north are in two groups, the Argentine Northern and the Central Northern. The former reaches the Andean provinces of San Juan, La Rioja and Catamarca from Cordoba and traverses a more or less sparsely settled district, except for certain oases where irrigation has been developed; the grape and wine traffic from San Juan is important. The Central Northern runs from Santa Fe through Tucuman to La Quiaca on the frontier of Bolivia, and the two systems are connected by a line from Cruz del Eje (near Cordoba) to Santa Fe. These lines, built primarily to reach the capitals of the outlying provinces, have been generally more or less neglected, but in recent years under much better administration are being put in reasonable condition to handle the traffic. As is almost inevitable, however, under government ownership, there is not possible that control of the personnel which is so necessary for efficient operation, and as the statistics show there is a very small showing on the right side of the ledger at the end of the year and there has been mostly a deficit, so there is a disposition to sell or lease these lines.

In the Argentine, as in all new countries which are developing rapidly, the demand on the government for money for the various necessary improvements is so great that it is difficult to keep pace with it, hence the desire to unload what it can.

The narrow-gage lines are thus divided now into three groups: The French lines radiating in three directions from Buenos Aires and extending north along the Parana up to Resistencia; the Central Cordoba starting from Buenos Aires and passing through Rosario and Cordoba to Tucuman, and the government lines reaching all the capitals of the northern and Andean provinces and scattered along the foothills of the mountains between San Juan and Bolivia, connecting at Cordoba and Santa Fe with other lines and having through communication to Buenos Aires.

These conditions on the narrow-gage lines must be kept well in mind, as they are just now emerging from the status of more or less isolated lines, doing a small local business, to that of a more or less coherent group or system of trunk lines connecting the national capital with the northern section of the country, and reaching nearly all the provincial capitals. As local lines doing a small business, the gage in itself mattered little, but now with the greatly increased business that is coming to them, and the growing necessity of running through express trains at fairly good speeds, they find themselves handicapped by reason of this very increase in business because they lack the facilities.

It will be noted that the broad-gage railways have through lines from Buenos Aires to Rosario, Cordoba, Santa Fe and Tucuman, and, by reason of their long establishment, better track and more comfortable, because easier riding, rolling stock, have up to the present monopolized the through passenger business to and from these points. In order, therefore, to get their share of this business the narrow-gage lines will be forced to make considerable improvements in their service, starting with the physical condition of their roadbed and track, and working up, and even then, of course, can never compete on even terms.

It is often pointed out in discussing the gage that these narrow-gage lines have done very well, that their capitalization is small and, therefore, there is no reason to change; but as will be shown later, it seems to the writer that they must look forward to the growth of the country and be prepared to meet it by modern economic means of transport or be crowded out. By the time they have provided adequate terminal facilities in the large cities, their capital expenditures will not be so much less than those of the broad-gage lines, and they can never, of course, handle the same amount of business.

Owing to the government requirements for through sleeping cars, the Central Cordoba trains for Buenos Aires often have to carry as many as five or six sleepers to be set off at different points on the government lines, besides the cars for their own requirements. Diners are run all the way through, as they are utilized, and do business at all hours of the day and night, so that altogether they have a fairly heavy train for such locomotives as are available for narrow gage, and to both Cordoba and Tucuman they have to compete with the broad gage which, of course, has a big advantage in passenger business.

Four-Track Scherzer Rolling Lift Bridge of the Great Southern Railway Over the Rio Riachuelo, Buenos Aires

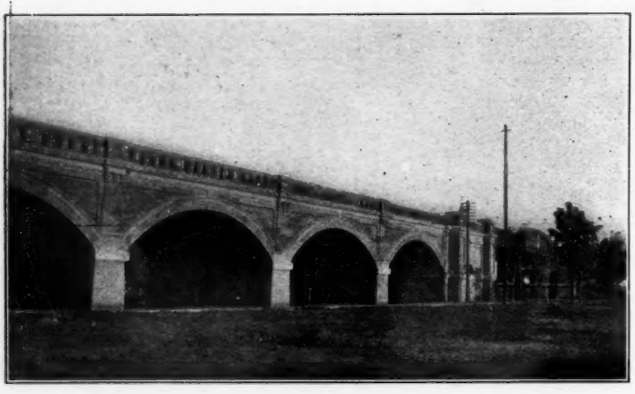
In addition to the narrow-gage lines referred to above, there is also the Transandine from Mendoza across the Andes into Chili; the Buenos Aires Midland, a small line running westerly from the city of Buenos Aires between the zones of the Southern and Western and now controlled and operated jointly by these two roads; the Province of Buenos Aires Railway Company (French) has a concession for an extension to its system to run from Buenos Aires to Bahia Blanca; a narrow gage line on which construction has been started is projected from Rosario to Mendoza. The Argentine Railway Company has a concession for a line from Santa Fe north into the Chaco; the provincial government has under construction a line named the Meridiano V, running westerly from La Plata, and has announced a project for the construction of a complete network of some 400 km. (2,485 miles) of narrow-gage lines throughout the province of Buenos Aires to be built by the state or under its guarantee.

It seems doubtful, however, if such a project will be favorably received, as the territory is already well served by the existing broad-gage lines which only earn about 5 to 6 per cent. on their investment, and it can undoubtedly be better served by extensions to the existing lines than by a new system of different gage which cannot get, or, to say the least, would find it very difficult to get, an entrance into Buenos Aires. The national government which controls the port has so far strenuously objected to anything but the broad gage for the port railways of the capital and could hardly consent to the adoption of a three-rail system to accommodate the meter gage without at the same time making some provision for the 4 ft. 8½ in. gage which already has an entrance to the city, and which will probably within the near future get within close touch with the port. Three gages for the port railways are unpractical, so until the gage question is settled it is unlikely that anything will be done for the meter or 4 ft. 8½ in. in the matter of direct access to the port.

There is a similar proposal to build a network of narrow-gage railways throughout the provinces of Entre Rios and Corrientes, and it seems to be assumed that the whole of the northern section of the country is to be developed by narrow-gage lines. The writer believes this to be unfortunate and unwise for reasons that he has stated quite fully elsewhere, not only because of the perpetuation and intermingling of lines of different gage, but also because the narrow gage is not adapted to the development of such a country as the Argentine, which in so many ways is bound to resemble the development of our own West. Some typical local stations "up country" are shown in the illustrations.

GOVERNMENT REGULATION

The government of the Argentine is modeled on that of the United States and follows it very closely. A very strict supervision is exercised by the national government over the interstate railways. The individual provinces or states may grant rights to railroads which are entirely within their own borders, but any line passing a provincial boundary comes under national con-

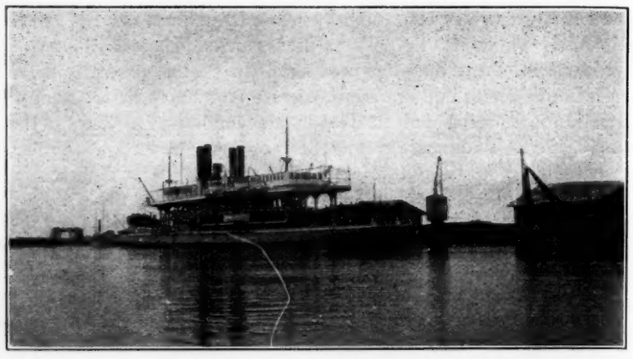


Brick Arch Viaduct at Entrance to Buenos Aires; Buenos Aires & Pacific Railway

trol, and this has led to many quite serious disputes, a typical case being that of the Meridiano V railroad now being built by the province of Buenos Aires. For some distance this line was located close to the line of the Province of Buenos Aires (French) railway which had been built and is being operated under a national concession which gave it exclusive rights within a certain zone. It was claimed that the rights would be violated if the provincial line was allowed to build stations and get business on that portion of its line which lay within the zone, and this contention was upheld by the national government, which prohibited the erection of the stations.

The national government agrees specifically (in some instances tacitly) to allow certain rights to lines for which it grants concessions and for which the concessionaires have to pay fairly highly either directly or indirectly; it exercises close control over the expenditures and the amount of capital which it will recognize, fixes rates and tariffs in the concession, and supervises all details of construction and operation. All timetables have to be submitted for its approval, and particular attention is paid to the matter of train connections at the intersections or junctions of the various lines. The government specifies, if necessary, the minimum number of trains to be run and their schedules; no construction of even a siding can be undertaken without preliminary approval of the plans.

This control is exercised by the Minister of Public Works through the "Direccion General de Ferrocarriles," and in com-



Car Ferry Boat on Parana River Between Ibicuy and Zarate; Entre Rios Railway

pensation for this it has been at least tacitly assumed that the railroads received certain protection and acquired certain rights, among others, to a more or less exclusive zone for their own exploitation. This proposal of the province of Buenos Aires, therefore, to build on the credit of the province a system of railways to compete with those built up by private and foreign capital, which latter without doubt, as admitted by all thinking Argentines, have been the means by which the large and rapid development of the country has been attained, is viewed with considerable alarm. This is particularly true, because it seems to be not an isolated case but merely a symptom of a more or less widespread movement which, if continued, will tend to destroy the confidence of foreign investors in the efficacy of the national government to carry out its agreements, even if they be only tacit, and protect the investments of foreign capital.

It seems probable, however, that wiser councils will prevail as, of course, the future development of the country and a continuance of its unexampled prosperity is dependent entirely on its ability to attract foreign capital in large quantities which undoubtedly will not be difficult, if it is given the assurance of that protection it has heretofore had.

The Argentine, like the United States, has arrived at the point not only in regard to the railway situation but in other matters also, where the importance of the national control and the lessened value of the sovereign rights of the constituent states is becoming more and more apparent, and in both countries, both organized under similar constitutions, it seems to a great many close and trained observers of the situation, that the future of our form of government is largely dependent on a wise solution of the difficulties. Strangely enough, these conditions which have changed so greatly since the constitution was written, have been largely brought about by the increased facilities for transportation provided by the railways, which are, in turn, themselves the greatest sufferers by reason of the divided or duplicated control.

PROVISIONS OF THE NATIONAL RAILWAY LAW

The following brief resumé of some of the provisions of the national railway law will give at least a general idea of its scope:

All railways are considered "national" which extend beyond the borders of any single province or territory and come under the provisions of the general railway law of 1891.

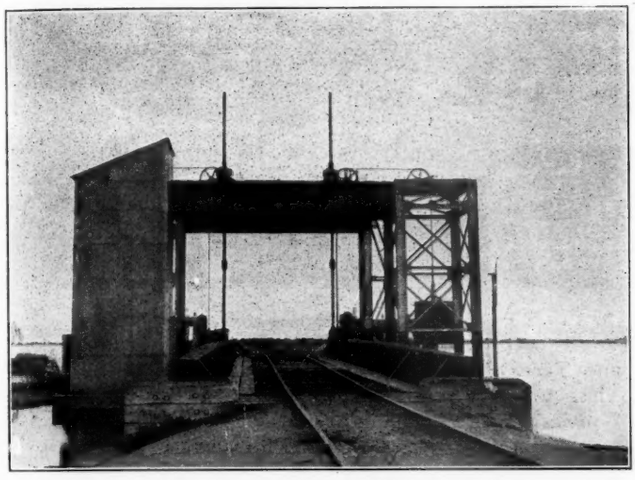
All "national" railways must have a legal residence in the

republic, must keep their books in Spanish according to the "Codigo de Comercio" and have a representative with full power of attorney to act for the company in all matters.

Inspection is under the direction of the minister of public works, under whom is an engineer with the title of director general of railways.

All employees who come in contact with the general public must speak Spanish.

The executive has the right to order the formation and schedule of all trains, personnel of the train crews, number



Ferry Slip and Transfer Bridge; Entre Rios Railway

and kind of vehicles, the order in which they shall be placed, signals and "avisos" (manner of despatching) maximum and minimum velocity, system of lighting, etc.

Mails and postoffice employees are to be carried free and special compartments or cars provided for mail.

All passengers have the right to continue in the same coach to the end of the journey *on each line,* with the exception of branches and industrial sidings.

Freight must be transported within a certain specified time, which requires a speed of four kilometers per hour for short distances and up to 10 kilometers per hour for 1,500 kilometers and over, and proportionately between. To this may be added an allowance of 24 hours for each change to other lines, 24 hours for each transfer to other gage and 48 hours for delivery. If cargo is to be delivered at a port, time ceases on delivery to port railway.

Reduced tariffs may be granted to shippers who accept longer time for transport.

Trains on the road are in charge of the conductor, but while stopped at stations and while switching are in charge of the station agent and cannot start until he gives the order.

The time of continuous service for employees, including stops, *except in case of delay* or *force majeur* must not be over 8 hours on passenger trains, 10 hours on mixed trains, and 12 hours on freight trains. Train crews must have a day off in seven.

When combinations with other lines are shown on the timetable and the train on the first road is too late to connect, a special train must be provided by the second line at the expense of the first.

Trains which are behind their schedule must not exceed the maximum velocity of their class in order to make up time.

Facing point switches must not be passed at a speed exceeding 12 kilometers (7.5 miles) per hour, unless the switch is provided with a safety device.

Maximum speeds must not exceed per hour: For broad and standard gage passenger service, 70 kilometers; freight, 40 kilometers. For narrow-gage (1 m.) passenger service, 50 kilometers.

Only with special authorization of the director of railways may these speeds be exceeded.

To allow trains to run at 70 kilometers per hour the lines must be in a good state of preservation, fully fenced, and level crossings protected.

When passing a station at which the train does not stop the speed must not exceed 12 kilometers per hour, except where there are rigid switches and no facing point switches.

When cars for carload lots are requested, they must be supplied in the order of the requests (with certain exceptions). A register of requests must be kept by the agent in stated form. The shipper has right to free storage in a railway warehouse if cars are not supplied promptly.

Cattle trains are to be moved on a schedule which requires the following speeds:

51 kilometers	5 hours	and proportionately between.
101 kilometers	10 hours	
286 kilometers	20 hours	
536 kilometers	30 hours	
1,036 kilometers	50 hours	
1,536 kilometers	70 hours	

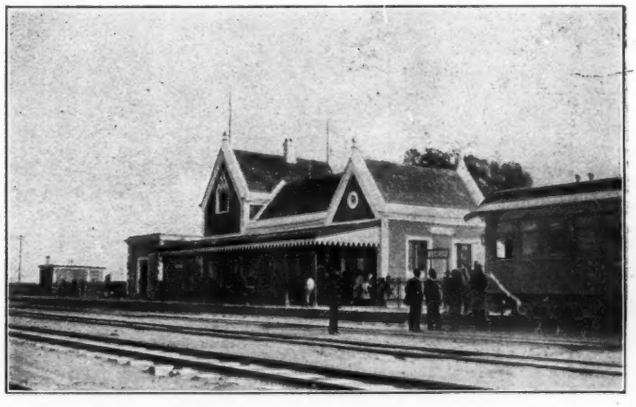
No rolling stock must be used until after examination and approval by the executive. After extensive repairs further approval is necessary before putting it back into use.

Compartments for mails are required in baggage cars.

The director of railways will fix each year for each railway the number of cars it must have for cattle shipments.

Companies which fix their tariffs without the intervention of the government cannot alter them in order to compete with other transportation companies either by land or water, previously established, during five years from the beginning of the works necessary for the establishment of these previous enterprises.

Tariffs may be regulated by the executive when the total net receipts for three years exceed 17 per cent. of the total capital, provided the expenditures do not exceed 60 per cent. of the gross income. The amount of capital which will be recognized by the government must be fixed before the line



Typical Country Station at a Junction Point

is opened, and cannot be increased without the approval of the executive.

Half rates must be given for government materials for public works, military supplies, officers and soldiers, government employees, immigrants forwarded from the central office, provincial police, and government telegrams.

Telegraph tariffs are to be the same as by the national telegraph, and lines and materials must be approved.

The following must be provided free: A special compartment for the transportation and classification of the mails and mail clerks; one telegraph wire put up and maintained for the use of the government; an office for mail and telegraph in the principal stations; facilities for loading animals at the principal points.

Drawbridges must be built at the expense of the railroad whenever ordered over canals and streams which may be declared navigable.

Any expense connected with inspection of plans, construction, etc., by the government is to be borne by the railroad.

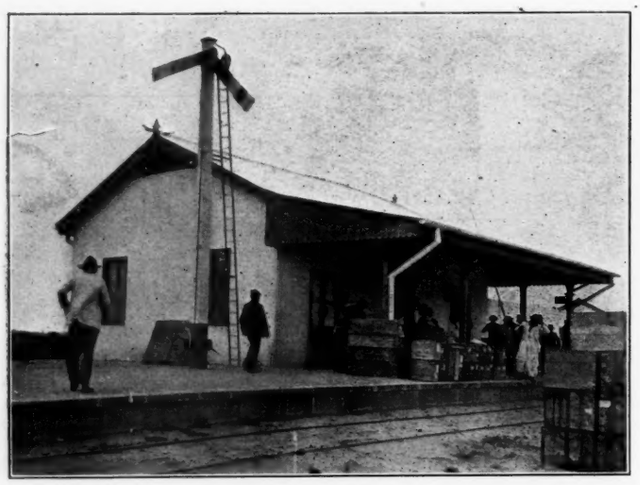
The construction and exploitation of all railroads is to be

under the general law. The legal residence of the railway company is to be in the capital of the republic.

THE GAGE QUESTION

There seems to be every reason to think that the progress of the railways of the Argentine, for at least some time to come, will not be less than it has been in the last two decades, and very likely will be more. In the opinion of the writer the time has come for an earnest consideration of the gage question, and this is one feature affecting the future development which is either not realized at all or at least only dimly by few. The broad-gage lines are satisfied, and considering only their own systems possibly they have every reason to be. Those associated with the narrow-gage seem mostly to be equally well satisfied, but seem to lean on past performances rather than to consider what they must face in the future when their lines must prove adequate and efficient for long distance transportation of bulk freight of fairly low grade, or give way to a transportation machine that will, or retard the development of the great northern section of the country. The medium-gage lines are confined to a separate section and can probably meet all conditions for the future, the principal problem they will have to face being adequate facilities at the port of Buenos Aires.

The section of the country south of Santa Fe, Cordoba and San Juan is dominated by the four big broad-gage lines and must be developed by extensions of these systems, which are being built now as fast and as continuously as a reasonable anticipation of the needs of this section demands. This part of the Argentine, though perhaps not on the whole as intensively developed as the United States, is closely comparable to it, inasmuch as there is no longer much, if any, opportunity for new railway systems and the development of new areas, and the future should be taken care of by the developments of the existing lines.

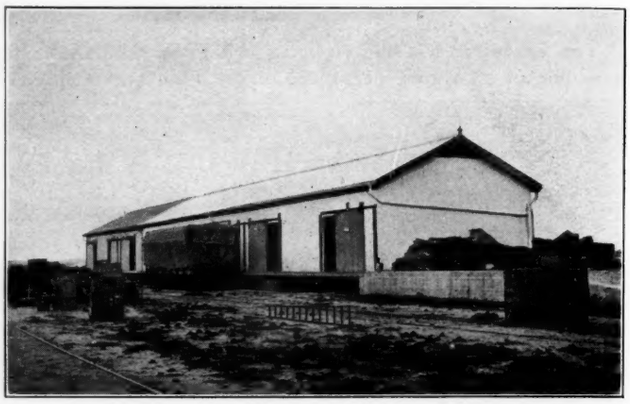


Typical Country Station

The medium-gage lines in the provinces of Entre Rios and Corrientes, with their connection to the Paraguay lines of the same gage, and the possibility of connecting with those of Uruguay, also 4 ft. 8½ in., should be allowed to develop their own territory provided they continue to show the enterprise in the future they have in the past few years since their connection to the National Capital. Their permanent way and rolling stock needs some toning up, but this is now being undertaken as rapidly as possible, and extensions are planned to take care of the increasing development of their territory. The land in the province of Entre Rios is almost, if not quite, as rich as the best in Buenos Aires and Santa Fe, and the development of this province in the past has only been retarded by its isolation, which has now been overcome by the through connection to Buenos Aires.

FUTURE DEVELOPMENT

The important development of the future will be in what is known as the "Chaco," that is practically that section in the triangle with the city of Santa Fe at its apex and the Pilcomayo river as its base, with the Parana river on one side and Tucuman and Salta and Embaracacion on the other. This, with the western part of Paraguay and southeastern Bolivia, forms a vast area of 150,000 sq. mi. or more which has been only partly explored and which still contains some unsubdued Indians. Much of it is good cattle country containing much quebracho, capable of growing maize, linseed, tobacco, sugar, cotton, etc.



Typical Freight Warehouse at Country Station

With the elimination of the United States as one of the sources of food supply for the old world and its entrance into the consuming class, the development of this and similar territories becomes more and more necessary, in fact, almost inevitable, and is only dependent on the available supply of capital. At present, of course, owing to the general stringency in the money markets of the world, there is a lull in new developments everywhere. A certain tendency towards radicalism in the national government of the Argentine, as elsewhere in the world, and more or less radical proposals like the one of the provincial government of the province of Buenos Aires, are also tending to create a feeling of uncertainty, but this seems to be more or less temporary, and among those who have studied these countries of southern South America, not only the Argentine, but southern Brazil, Paraguay, Uruguay and southeastern Bolivia, it seems as if the growth of this section in the twentieth century may prove to be in a measure comparable to that of the United States in that just past.

That the thinking and experienced men of the Argentine fully realize this obligation to foreign capital and the need of protecting and encouraging it, is shown by the recent statements of Dr. Esequiel Ramos Mexia, former minister of public works, and one of the most able and far-seeing men who have filled this office in the Argentine. In his book entitled "A Plan of Public Works and of Finances for the Argentine Republic," which has just been published, he deprecates the attitude of radicalism or socialism towards capital, and says: "Of course it is understood that congress and government will continue the old and wise policy of respecting private capital; as if laws are voted contrary to this wise policy, if the States construct competing lines over and above nations; if such attacks on the national progress are com- the rights of congress, which has the exclusive faculty of regulating commerce between the States and with foreign mitted without a corrective, then there is no hope that private capital will undertake further railway construction in this country. If it is desired to attract capital it is necessary to inspire confidence, abstaining from treating it with harshness and not permitting that in its own house others plunder it."

Mikados on the Canadian Pacific

A Number of Locomotives of This Type Are in Regular Passenger Service; Special Features of the Design

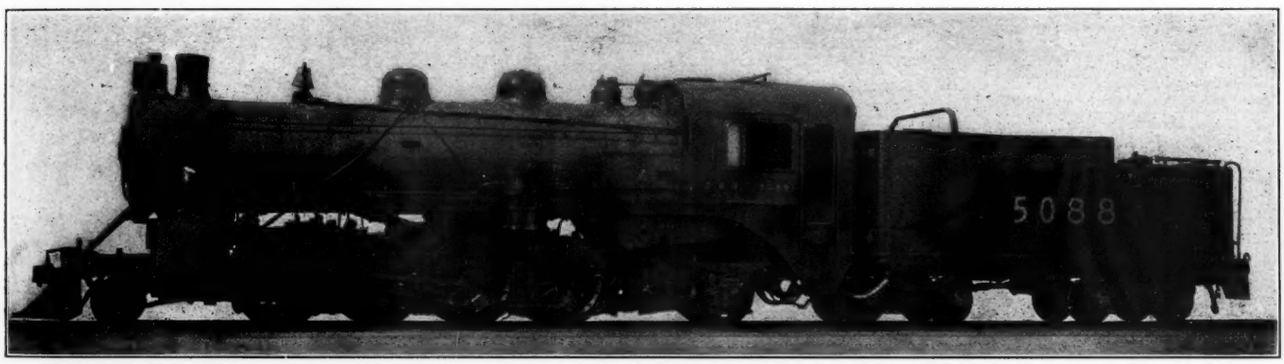
In the April, 1914, number of the *Railway Age Gazette, Mechanical Edition,* there is published an article by W. H. Winterrowd, mechanical engineer of the Canadian Pacific, describing the Mikado type locomotives in service on that road. The following is an extract from this article:

There were built during the year 1913 for the Canadian Pacific by the Montreal Locomotive Works, 75 Mikado type locomotives with a tractive effort of 42,000 lb. With but few modifications, these engines were duplicates of 20 locomotives designed and built at the Angus shops of the Canadian Pacific during 1912.

These locomotives have 23½ in. by 32 in. cylinders, 63 in. diameter drivers, 180 lb. steam pressure, a total heating surface of 4,738 sq. ft.,* and weigh 258,000 lb. in working order, with a weight of 198,000 lb. on the drivers.

On account of the necessity of keeping within permissible wheel load limits, an endeavor has been made to develop maximum power with minimum weight. In this connection it is of interest to note that with the weight of engine mentioned, a very large heating surface has been obtained.

With the exception that the boiler has been lengthened, and a trailer truck added, these locomotives are nearly identical with the consolidation engines, previously the prevailing type of heavy freight power on this road. The practical value of such design and its beneficial effect on maintenance and repair costs are too evident to require discussion.



Canadian Pacific Mikado Type Locomotive

It is an established fact that the Mikado type of locomotive is admirably adapted to haul slow heavy freight trains one day, and fast freight trains the next. The Canadian Pacific has gone a step farther and introduced this type of locomotive in passenger train service. The majority of the Canadian Pacific Mikados are in freight service, but a number of them have been assigned to regular passenger duty on the main line between Sherbrooke and Megantic, Que., on the Eastern division.

Between the two points mentioned the line varies 1,220 ft. in elevation within a distance of 68½ miles. From the accompanying profile it may be noted that within this distance the maximum gradient is 1.72 per cent., and the maximum track curvature is 6 deg. 7 min.

The scheduled time from Sherbrooke to Megantic is 2 hours 30 minutes. Deducting from this the time for four regular and two flag stops, the actual running time over the division averages 2 hours 15 minutes. This means an average speed of approximately 30 miles per hour.

The trains that these engines are hauling consist of ten and twelve cars, half of which are sleeping cars. Before the advent of the Mikado, these trains were drawn by the standard Pacific type locomotives, and to make the scheduled running time under adverse conditions, it was frequently necessary to resort to double heading. The Mikados have obviated the necessity for two engines, and under the most extreme climatic conditions are doing excellent work.

These engines embody a number of interesting features, chief of which is the engine truck. Instead of using the truck commonly known as the swing link type, a design has been used which carries the weight transmitted to it on a pair of double face centering wedges. On account of the use of these wedges the trucks are commonly called wedge trucks.

With this arrangement there is no truck center pin. The front end of the main equalizer rests on the top of a casting called the upper wedge tie, or bolster. This casting is guided in its vertical movement by the front foot plate into which it extends. To this upper wedge tie a pair of double faced wedges is bolted, which in turn rest on a similar bottom pair bolted to the truck frame casting. The wedges themselves are so designed that, regardless of the movement of the truck, a set of faces on each pair of top and bottom wedges is always in contact.

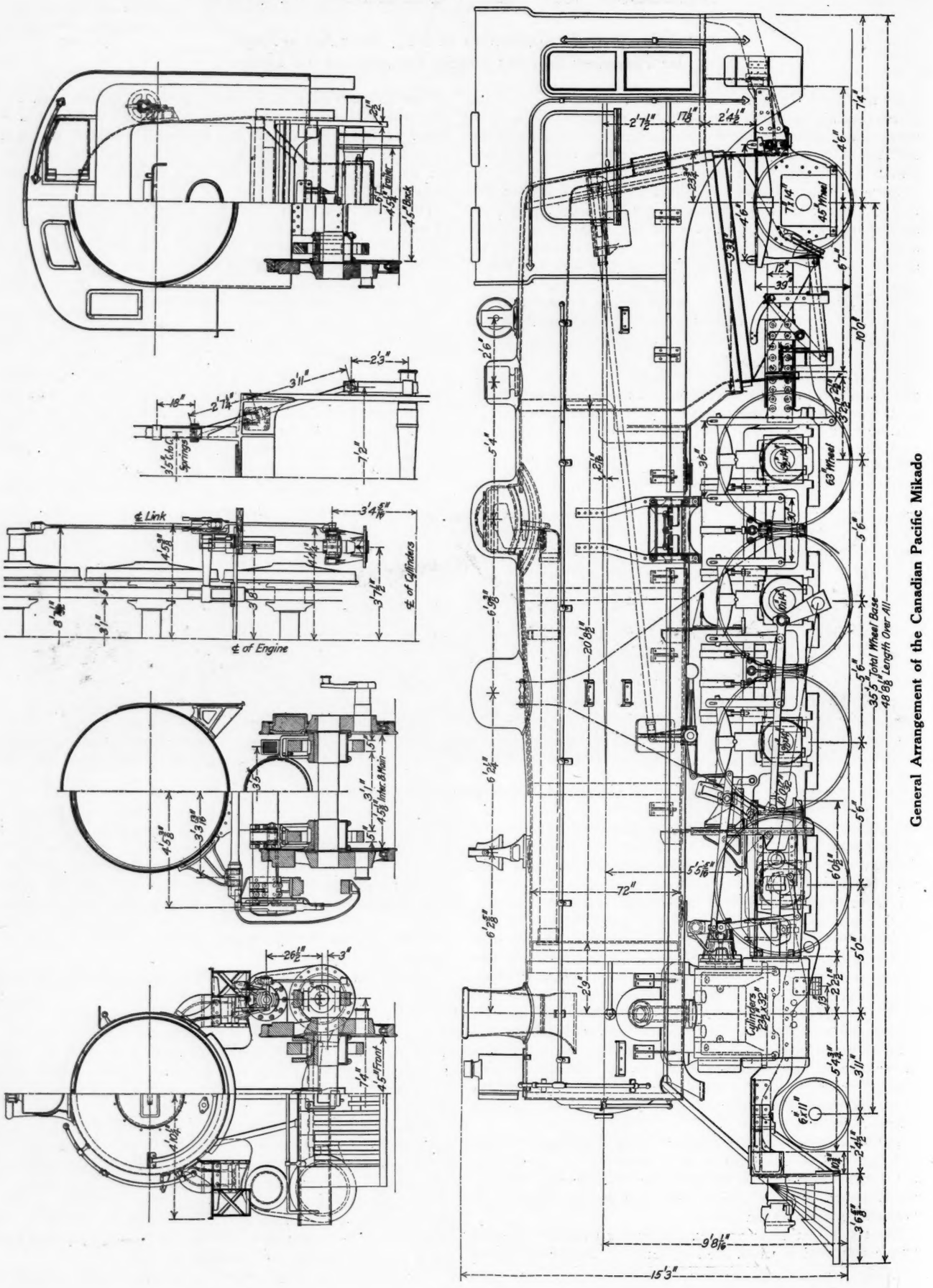
Each individual wedge possesses three distinct wearing faces. The two smaller, or outer faces, lie in the same plane and are inclined in one direction. The center face is inclined in the opposite direction. These faces are all inclined in their respective planes at an angle of approximately 22 deg. The sum of the areas of the two outer faces is equal to the area of the center face. With the top wedges in the central position, and superimposed on the bottom ones, all the frictional faces of the wedges are in contact.

Another interesting feature is the combined back steam chest cover and valve stem crosshead guide. The back steam chest cover, the valve stem crosshead guides, and the support for the rocker arm, through which the motion is transmitted to the valve stem, are combined in one casting. This is a cast iron structure adequately ribbed and well proportioned. This casting supports a double armed rocker, whose arms extend downward.

The valve stem crosshead block is held by a 1 13/16 in. pin passing through the extremities of these arms. The weight of the combination lever and radius rod is carried on an extension of this pin, which is 2¼ in. in diameter at the point where it passes through the combination lever. The rocker arm is likewise a single casting supported by two journals 3 1/64 in. in length and 4 in. in diameter. The use of the large journals and large motion pins tends to minimize the wear.

The chief object of this construction has been to provide a

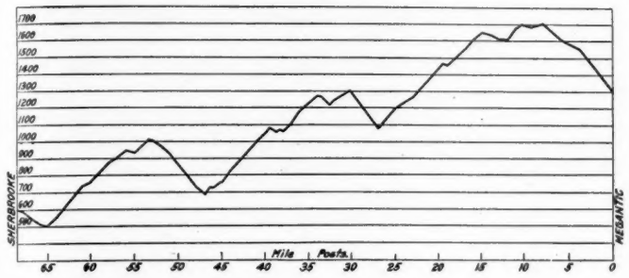
*Equivalent heating surface.



General Arrangement of the Canadian Pacific Mikado

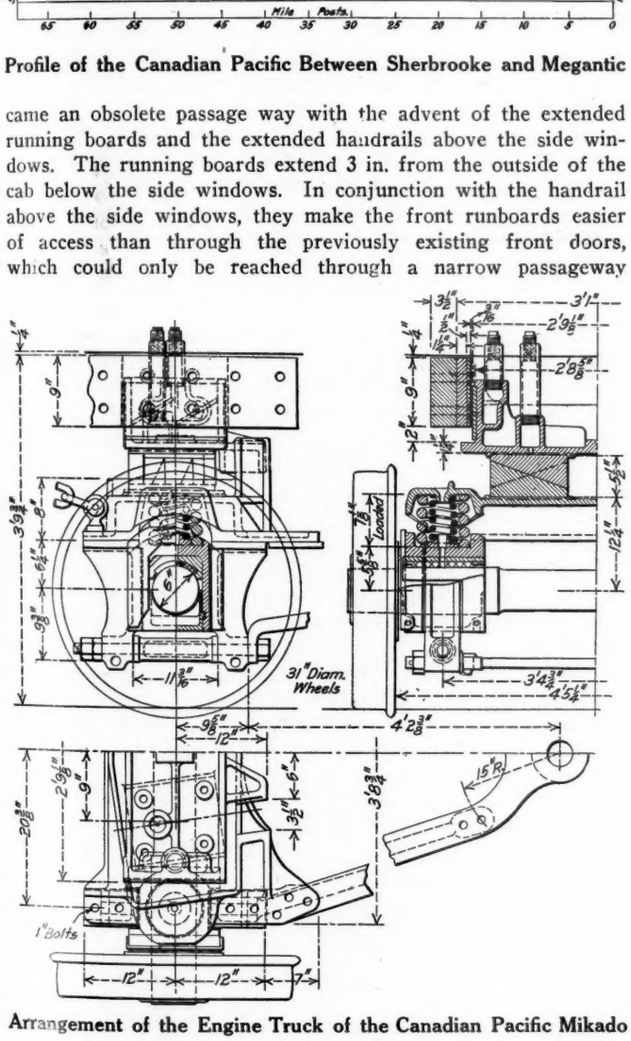
rigid support for the valve stem guide. The device not only accomplishes this purpose, but relieves the valve stem from any downward thrust due to the movement and weight of the parts of the valve gear to which it is connected. Should any excessive wear develop in the pins or guides, the result is the same.

These locomotives are all equipped with the vestibule cab which completely encloses the deck space between the engine and tender, and protects the enginemen from the intense cold that prevails at times. In these cabs the front doors have been eliminated and windows substituted. The front cab doors be-



Profile of the Canadian Pacific Between Sherbrooke and Megantic

came an obsolete passage way with the advent of the extended running boards and the extended handrails above the side windows. The running boards extend 3 in. from the outside of the cab below the side windows. In conjunction with the handrail above the side windows, they make the front runboards easier of access than through the previously existing front doors, which could only be reached through a narrow passageway



Arrangement of the Engine Truck of the Canadian Pacific Mikado

partially obstructed by piping. That the vestibule cab has proved its merit is evinced by the fact that at the present time 207 Canadian Pacific locomotives are so equipped.

The tenders are the type in which the underframe and tank are an integral and self supporting structure. This type has proved so economical and so easy of fabrication that it has been made standard on the Canadian Pacific. The coal space has a capacity of 16 tons, and all of the tenders are equipped with air actuated coal pushers of the hinged type. A very large percentage of all the engines on this road have tenders equipped with this type of pusher. The tanks have a capacity of 7,000 Imperial gallons, equivalent to approximately 8,500 U. S. gallons.

The locomotives are all equipped with the Vaughan-Horsey superheater. They are also equipped with screw reverse gear and Westinghouse 8½ in. cross compound pumps.

The general dimensions, weights and ratios are as follows:

General Data

Gage	4 ft. 8½ in.
Service	Freight and passenger
Fuel	Bituminous coal
Tractive effort	42,000 lb.
Weight in working order	258,000 lb.
Weight on drivers	198,000 lb.
Weight on leading truck	25,000 lb.
Weight on trailing truck	35,000 lb.
Weight of engine and tender in working order	428,000 lb.
Wheel base, driving	16 ft. 6 in.
Wheel base, total engine	35 ft. 5 in.
Wheel base, engine and tender	66 ft. 5 in.

Ratios

Weight on drivers ÷ tractive effort	4.70
Total weight ÷ tractive effort	61.50
Tractive effort × diam. drivers ÷ heating surface*	560.00
Total equivalent heating surface* ÷ grate area	94.70
Firebox heating surface ÷ total equivalent heating surface, per cent.	3.97
Weight on drivers ÷ total equivalent heating surface	41.80
Total weight ÷ total heating surface*	54.50
Total heating surface* ÷ volume of cylinders	294.00
Grate area ÷ volume of cylinders	3.11

Cylinders

Kind	Simple
Diameter and stroke	23½ in. x 32 in.

Valves

Kind	Piston
Diameter	12 in.
Greatest travel	6 in.
Lap	1 in.
Inside clearance	Line and line
Lead	¼ in.
Type of valve gear	Walschaert

Wheels

Driving, diameter over tires	63 in.
Driving, thickness of tire	3½ in.
Journals, main, diameter and length	10 in. x 14 in.
Journals, others, diameter and length	9½ in. x 14 in.
Engine truck wheels, diameter	31 in.
Engine truck journals	6 in. x 11 in.
Trailing truck wheels, diameter	45 in.
Trailing truck journals	7 in. x 14 in.

Boiler

Style	Extended wagon top
Working pressure	180 lb.
Outside diameter first ring	72 in.
Outside diameter dome course	79 in.
Firebox, length and width, inside	8 ft. 7¼ in. x 5 ft. 9⅛ in.
Firebox plates, thickness	½ in., 5/16 in. and ⅜ in.
Firebox water space	Front, 5 in.; Sides, 4½ in.; Back, 3½ in.
Tubes, number and diameter	210—2¼ in.
Flues, number and diameter	30—5¼ in.
Tubes, thickness	No. 11 B. W. G.
Flues, thickness	No. 8 B. W. G.
Length over tube sheets	20 ft. 8½ in.
Heating surface, tubes	3,410 sq. ft.
Heating surface, firebox	188 sq. ft.
Total fire heating surface	3,598 sq. ft.
Superheating surface	760 sq. ft.
Total equivalent heating surface	4,738 sq. ft.
Grate area	50 sq. ft.
Superheater, kind	Vaughan-Horsey
Center of boiler above rail	116 1/16 in.

Tender

Wheels, diameter	36¼ in.
Journals, diameter and length	6 in. x 11 in.
Water capacity	7,000 Imperial gal.
Coal capacity	16 tons

*Total equivalent heating surface.

THE TANGIER-FEZ RAILWAY OF MOROCCO.—Under the terms of the Franco-German agreement of 1911, the Tangier-Fez line is the one which is to receive the first consideration in the way of new railways in Morocco. Plans for its construction have been under consideration for some time and work is to be pushed on it as rapidly as possible. In the meantime, several military railways are being constructed. Lines already exist from Casablanca to Settat, and from the former point to Rabat, Kenitra and Mequinez. The latter line is to be continued to Fez, and there is a line under construction from Laraiche to Alcazar. The construction of the Tangier-Fez line will require extensive improvements at the port of Tangier. That matter is also under consideration and plans for the required changes are well under way.

TRAIN ACCIDENTS IN FEBRUARY[1]

Following is a list of the most notable train accidents that occurred on railways of the United States in the month of February, 1914:

Collisions

Date.	Road.	Place.	Kind of Accident.	Kind of Train.	Kil'd.	Inj'd.
1.	Phila. B. & W.	Perryman.	rc.	F. & F.	0	3
6.	Grand Trunk	Foster's.	bc.	F. & F.	3	0
8.	Balt. & O.	Deer Park.	xc.	F. & F.	0	4
16.	St. Louis & S. F.	Nichols, Mo.	bc.	P. & P.	0	0

Derailments

Date.	Road.	Place.	Cause of Derailm't.	Kind of Train.	Kil'd.	Inj'd.
2.	Atlantic C. L.	Lundy.	malice.	P.	1	5
†9.	C. St. Paul M. & O.	Bigelow.	b. rail.	P.	2	16
22.	Penn.	Transfer, Pa.	unx.	P.	0	30
23.	Chi. B. & Q.	Arbela, Mo.	unx.	P.	0	0

The trains in collision at Perryman, Md., on the 1st were eastbound first class trains, but they carried no passengers. The leading train, a mail train, was run into at the rear by a train of express cars, after the latter had been stopped by a flagman. The collision was due to the failure of the engineman of the express train to keep a good lookout. Three mail clerks were injured.

The trains in collision near Foster's, Mich., on the 6th, were a northbound extra freight and a work train running in the opposite direction. One brakeman and two bridge men were killed. There was a blinding snow storm at the time. The collision was due to an improper despatcher's order and to the failure of the work train to protect itself.

In the collision on the Baltimore & Ohio at Deer Park, Md., on the 8th of February, a westbound freight train ran into the side of a switching engine. Four trainmen were injured. It is said that the freight had run past distant and home signals set against it.

The trains in collision at Nichols, Mo., on the night of February 16, were passenger No. 8 of the Eastern division, and No. 104 of the Northern division. Two passenger cars were overturned.

Train No. 8 runs for a short distance on the Northern division, and over this section right to the road is given by means of the staff system; and the engineman of No. 8 entered on this section without securing the staff. This engineman, in service 10 years as a runner, appears to have neglected to apply the brakes until it was too late to stop before fouling the main track of the Northern division.

The train derailed at Lundy, Fla., on the 2nd, was northbound passenger No. 84 and the engine was overturned. Four cars were badly damaged. The fireman was killed and the engineman and four other persons were injured. The cause of the derailment was a bolt which had been placed on the rail by some person unknown.

The train derailed at Bigelow, Minn., on the 9th, was northbound passenger No. 2; and seven cars were overturned. One passenger was killed and 13 passengers and 4 trainmen were injured, one of the latter, an express messenger, fatally. The derailment was due to a broken rail.

The train derailed near Transfer, Pa., on the night of the 22nd, was eastbound passenger No. 216. Thirty passengers were injured, none seriously. The cause of the derailment could not be determined, the track being in good condition, and the inspectors being unable to find anything wrong with engine or cars.

The train derailed at Arbela, Mo., on the 23rd, was eastbound passenger No. 1. It was drawn by two engines. The train was running at about 30 miles an hour, but no passengers or trainmen were seriously injured. It is believed that the derailment was due to failure of a tender truck, but no evidence could be found.

Electric Car Accidents.—Of the electric car accidents reported by the newspapers as occurring in the United States in the month of February, only three appear to have been serious; a collision on a railroad crossing, reported from Toledo, on the 12th; a similar accident reported from Pittsburgh on the 19th, and a rear collision of electric cars at Indianapolis on the 18th. In the last named accident four persons were killed and five seriously injured.

Canada.—A passenger train of the Canadian Pacific was derailed by a broken rail near Inkerman, Ont., on the 17th, and the engineman was killed. Near Moncton, N. B., on the 20th, an engine and a snow plow fell through a bridge, and four trainmen were killed.

[1]Abbreviations and marks used in Accident List:
rc, Rear collision——bc, Butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious or mischievous obstruction of track, etc.——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

COST OF FULL CREW LAWS

The special committee on relation of railway operation to legislation, supplementing its bulletin No. 55 issued last October, in which were shown the full crew laws of different states, reports that on 98 roads the total estimated yearly cost of complying with these laws is $6,800,729. Sixty-five other roads, operating 31,653 miles of line, report that they are not affected by this legislation. The estimated number of trains affected and the estimated costs in different states are shown in the accompanying table. The present report is entitled bulletin No. 57.

COST TO THE RAILROADS OF COMPLYING WITH FULL CREW LAWS

States having laws which affect train or switching crews.	No. of roads	Estimated number of trains per annum affected by State Laws: Freight	Passenger	Switch	Other trains	Total	Estimated cost per annum of compliance with State Laws: Freight	Passenger	Switch	Other trains	Total
Arizona	5	16,727	10,330	.....	721	27,778	$59,618	$19,016	.....	$1,322	$79,956
Arkansas	10	65,821	12,297	20,365	1,063	99,546	184,547	19,404	$80,312	3,837	288,100
California	6	22,500	48,303	312	24	71,139	60,604	82,093	976	72	143,745
Connecticut	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Indiana	23	73,353	58,410	11,647	1,938	145,348	188,069	112,583	41,729	6,524	463,905*
Kansas	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maine	1	.....	.....	1	.....	1	.....	.....	603	.....	603
Maryland	8	49,873	52	.....	.....	49,925	107,397	123	.....	.....	107,520
Missouri	10	44,653	18,382	.....	.....	63,035	232,649	63,926	.....	.....	407,221*
Nebraska	3	1,240	6,665	.....	.....	7,905	4,464	14,142	.....	.....	18,606
Nevada	4	1,036	820	365	624	2,845	3,690	2,595	1,314	5,000	12,599
New Jersey	9	128,911	121,764	1,392	1,090	253,157	231,113	150,841	5,763	1,606	389,323
New York	17	397,055	154,627	10,470	32,796	594,948	1,074,949	287,853	36,711	125,060	1,524,573
North Dakota	1	60	.....	.....	312	372	300	.....	.....	1,200	1,500
Ohio	16	23,138	39,456	14,307	.....	76,901	46,432	88,467	49,428	.....	209,327*
Oregon	4	10,026	1,077	.....	.....	11,103	42,435	3,327	.....	.....	45,762
Pennsylvania	22	443,366	216,741	4,745	1,249	666,101	1,222,372	323,752	10,139	4,789	1,561,052
South Carolina	1	27,348	22,088	13,740	4,512	67,688	75,207	59,637	41,220	13,701	189,765
Texas	5	79,660	35,919	1	1,013	116,593	791,218	243,636	.....	82	1,034,936
Washington	6	57,149	13,955	.....	6,829	77,933	237,419	22,245	.....	22,106	281,770
Wisconsin	6	.....	26,737	.....	313	27,050	.....	39,386	.....	1,080	40,466
Total		1,441,916	787,623	77,345	52,484	2,359,368	$4,562,483	$1,533,026	$268,195	$186,379	$6,800,729*

*Details which comprised totals were not reported by some roads.

Why Eastern Railways Need Higher Freight Rates*

Operating Expenses Increase in Spite of Efficient Management. Public Sentiment Becoming More Friendly

By Daniel Willard
President, Baltimore & Ohio Railroad

It has gradually come about that under existing conditions the rates and charges now in effect in official classification territory do not yield sufficient revenue properly to meet the situation, and the railroads are endeavoring, at the present time, to obtain permission to advance their freight rates approximately five per cent. I shall not recite the causes which have brought about the present situation, because I assume you are already familiar with that phase of the subject. Neither is it my purpose to emphasize, at this time, the arguments that have been presented in the case now before the Interstate Commerce Commission, but I cannot discuss my subject fully and freely unless to some extent use is made of information which has already been developed in that connection.

In the present rate case, it has been shown, for instance, in statements presented to the Interstate Commerce Commission, that 35 roads in official classification territory have actually added to their property investment since 1910, for additional facilities and equipment, over $659,000,000, but as a result of operations in 1913, although the gross earnings of the 35 roads were $186,775,000 greater than in 1900, the net earnings, after paying operating expenses and taxes, were actually $16,311,000 less than in 1910, showing that not only had these particular companies failed to earn any return whatever upon the new capital invested, but they actually had $16,311,000 less net as return upon their previous investment than was the case before the large additional amount of money had been put into the plant, and of course it is unnecessary to say to you, as business men, that no business enterprise can continue on such a basis.

It has been stated by men who have given this matter careful consideration, that the growing needs of the commerce of this country will require an additional expenditure by the railroads for new equipment and facilities, of upwards of a billion dollars a year for some years to come, and under existing conditions, the only way in which such money can be obtained is through private enterprise—actuated, of course, by the desire for private gain. Men having money to invest will not put it in railroads unless they believe that money so invested will upon the whole bring as safe and satisfactory return as might properly be expected if invested in other directions, and railroad investments must be made sufficiently attractive to secure new capital, else development, which means new cars, new engines, new stations, new tracks and other facilities, will cease, and nothing can more effectually check, if not absolutely stop, the growth of commerce than insufficient transportation facilities.

How may the new capital needed be obtained? How may railroad investments be made attractive? By permitting the railroads to impose such reasonable charges for service performed as will, with economical and intelligent operation, yield sufficient net to pay fair return upon the capital required.

The claim is frequently made, and rarely denied, that the American people are fair, and that ultimately they may be depended upon to do what is reasonable and right. Nevertheless, it sometimes appears as if they were not willing at all times to do what is fair and right toward the carriers, and the question naturally arises, why should a people of recognized fairness, be unfair or feel unkind, if they do, towards the railroads?

I think this feeling is due largely to the fact that in the past the railroads did things that in the light of present day standards ought not to have been done. I might, in this connection, if it were worth while, urge extenuating circumstances, but within the limited time at my disposal, I think it would be more profitable to consider instead the situation as it exists today. It is beyond doubt that there has been a more or less general feeling of hostility towards the railroads, and it was due, among other things, to the fact that the railroads exercised at times, we will say, or at least they were supposed to have done so, a control over some of the people's representatives and public officers, that was not in harmony with our democratic ideas of government. They showed partiality between shippers and between communities, as regards rates, passenger fares and conditions of service. They were not sufficiently considerate of the rights of others, and further, financial transactions of an objectionable character were suspected and disclosed in numerous instances. All this finally developed a feeling of pronounced hostility on the part of the public generally towards the railroads and those who represented them, and this feeling found expression in laws framed to correct the things complained of.

The Interstate Commerce Commission, which came into existence in 1887, was the result of a nation wide demand that certain abuses should be corrected. The things chiefly complained of at that time were, as I have suggested, the misuse of passes, the granting of rebates, the hauling of freight a longer distance for a less amount than was charged for a shorter distance, and the evils connected with the so-called pooling system, etc.—all, I may say, the natural fruits of competition. The commission, then established, has been given the power necessary to correct the things above referred to. The Interstate Commerce Commission is one of the most powerful bodies of the kind in the world, and in it the people have the strongest possible guarantee against misuse of power by the railroads.

It has been frequently stated that the railroads, or at least some of them, are incompetently and dishonestly managed. Men engaged in the railroad business are human and in no way different from those engaged in other business undertakings. It has developed in certain instances, I regret to say, that men holding official positions with railroads have been unfaithful to their trusts; conditions of extravagance have developed in localities, and uneconomical methods have been disclosed. I suppose the same may be said concerning any other undertaking in connection with which a considerable number of men are employed, because in such cases there is always the element of human weakness to contend with. However, as matters exist today, the railroads are obliged to keep their accounts in accordance with methods prescribed by the Interstate Commerce Commission; they are, in fact, prohibited by law from keeping them in any other way, and their books must be open at all times for inspection. Under such conditions, it is practically impossible for dishonest methods to be followed for any considerable length of time without detection, and in this connection I wish to state in the strongest manner possible that in my opinion there is no more efficient, high minded or honorable body of men to be found anywhere, than those who today constitute the official staff of the American railroads. I do not claim they are better than other men; I do assert, however, that they are just as good, and my belief is based upon an intimate knowledge of and acquaintanceship with the men in mind, of more than 30 years duration. Further, there is no incentive to wasteful or inefficient operation, but on the contrary there is the strongest possible incentive to efficient and economical operation. Those who manage the railroads are endeavoring to do so in such a way as to make them profitable to the owners, as well as satisfactory to the public. In other words, they are actuated, we will say, by the feeling of selfishness—the same

*An address delivered before the Traffic Club of Pittsburgh, March 27, 1914.

feeling which actuates each one of us as individuals, in all of our business undertakings. We must admit that as a rule the real incentive behind the farmer, the merchant and the manufacturer is the desire for private gain, or gain for self.

It should be remembered, however, that the railroad, quite unlike the ordinary manufacturing or business enterprise, extends over many miles of country, and its operations on that account are extremely difficult to supervise; and because of its public character, the railroad is constantly required to sacrifice economy in the interval of safety, despatch or the commercial requirements of the service. All of these features make it difficult to obtain such economy and efficiency in service as might otherwise be expected. They do not make efficiency or economy impossible, but they do make both more difficult, and in any event, the efficiency of American railroads has been a matter of amazement to the railroad managers and students of economics from every other country in the world. It is possible that further economics will be effected in the cost of transportation. It is certain, however, that the demands of commerce, of labor, of the regulating bodies and of the people themselves, expressed in various ways, will continue to add to the cost of operation, and it is doubtful if all the further economies possible will offset the increase to be expected from the causes just mentioned.

The claim is also frequently made that the capitalization outstanding against American railroads is largely in excess of their fair valuation, and that it represents, in the popular language of the day, watered stock and securities. It is interesting to note in this connection, however, that the outstanding capitalization of the entire American railway system, as shown by last report, 1911, of the Interstate Commerce Commission, was $63,944 per mile, as compared with $275,354 per mile in United Kingdom, $143,648 per mile in France, $117,837 per mile in Austria, and $113,326 per mile in Germany.

In response to a public demand—based, I believe, upon a misunderstanding of the facts—the Congress has provided for a federal valuation of all the properties of the railroads, money has been appropriated for that purpose, and the necessary machinery set in motion. The carriers are confident that a fair valuation will show that the railroads, as they exist today, are actually worth a sum very greatly in excess of all outstanding capitalization. It is possible this statement may need qualification concerning some individual companies, but there is no doubt in my mind that it will fairly apply to the situation as a whole.

It should be remembered, in justice to those who have invested their money in railroad securities and to those who have spent their lives in the service of the railroads, that, notwithstanding all that has been said in criticism of railroad methods and management, the capitalized cost per mile of the American railroads as a whole has been less than one-half the average cost of the railroads in Europe. Further, the freight rates on American railroads are, upon the average, but little more than one-half what they are in Europe, while the wages paid American railroad employees are from two to three times as high as those paid similar employees in any other country in the world, with the single exception of Canada on our north.

At the present time the railroads of the country generally are managed by men who have grown up in the service, and have been, and now are, devoting their best talents to that end. They appreciate the change that has come about concerning the relation of the railroad to the public; they understand thoroughly that the railroad today is a semi-public institution, and because of that fact, the officers and employees of the railroad are semi-public servants. Further, they appreciate fully that the railroad, as a semi-public institution, is charged with a very important public duty to perform—that is to say, the duty of furnishing transportation of a generally satisfactory character to all who desire to make use of its facilities, but they also realize that, in addition to the duties which they, as semi-public officers, owe to the public, they at the same time hold a very important and no less honorable position as trustee for those whose money has made the railroad possible. They know, however, that they are best performing their duties as trustees when they are operating the railroads so as to best serve the territory through which they pass. They clearly understand that the best interests of the railroad are identical with the best interests of the community which it serves.

Our country is one of magnificent distances, and no people in the world make so free a use of transportation as do the people of the United States. The latest official records show that in Germany the railroads carry 490 tons one mile per annum for each individual; in France, 336; in England, 292; and in Austria, 184; while in the United States as a whole, the number of tons carried one mile for each individual is 2,500, or nearly six times as much as is carried in any of the countries just mentioned. This is due to the fact that it is our established economic policy as a nation to raise our wheat, dig our coal, and mine our ore at the place where each can be most economically produced, and then move it to the place where it is needed by the ultimate consumer, over what I venture to say is the best transportation system in the world. Without doubt this system of domestic economy has contributed largely to the wonderful development of our country; but in order that it may continue, it is of prime importance that there should also continue to be an efficient transportation machine, and for that machine—unless we depart entirelv from our present policy—we must depend upon private capital, and that can only be obtained by the reasonable expectation of satisfactory reward.

I do not think the necessity for increased revenue on the part of the carriers in official classification territory is seriously questioned by anyone at the present time. I shall not take your time to discuss whether the increased revenue which the carriers need should be obtained by advancing passenger fares, by increasing, if possible, the charges for carrying the mails and express, by increasing some freight rates and not increasing others, or from various other suggested sources. It is perhaps sufficient to say that those representing the carriers gave the whole subject their best thought and concluded that the most practicable, and upon the whole the best way to meet the situation at the present time was to advance all freight rates a small and uniform amount. There is doubtless much to be said both for and against some of the other methods suggested.

I would like to say just a word before I close about the present attitude of the press towards the railroads. Four years ago, when the Eastern carriers endeavored to advance freight rates, the press was generally opposed to the movement; today, however, it is practically unanimous in support of the railroads' position and this change of attitude has been much commented upon and much misunderstood. It has been said, for instance, in the halls of Congress that all manner of schemes have been worked to create public sentiment favorable to the increase of railroad rates. That efforts have been made to create a sentiment favorable to the railroads in the present rate matter, I will not deny. I do assert, however, and as chairman of the Presidents' Committee I am in position to know, that such efforts have been confined to the simple procedure of presenting the facts.

The railroads have been criticized in the past, and perhaps rightly so, for not taking the public into their confidence. In the present case we have tried, I have tried, others have tried to do the thing that we have been criticized for not doing in former years. We have stated our case to the public and we have done so because we have felt that it was a matter in which the public was largely interested and concerning which it ought to be informed; and, while it is not to be presumed that the Interstate Commerce Commission will be or should be influenced by public opinion, still the commission, because it also is the servant of the public, has the right to know the public's view concerning a matter of such prime importance. If the press in a large sense truly represents public opinion—and I sincerely believe it does—then the carriers may well feel gratified by the attitude of the public in the present case.

I am glad of this opportunity to express my appreciation of the very fair and intelligent manner in which the question has been discussed in the columns of our great dailies and other publications, and I appreciate it all the more because of my belief that they truly represent the real feeling of the people.

Notes on the Design of L. C. L. Freight Houses*

A Comparative Study of the Various Types from the Standpoint of Economy in Fuel Charges and Operation

By E. H. Lee
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The package freight business of large cities is an important part of city freight traffic, in Chicago amounting approximately to 10 per cent. of the total tonnage and 25 per cent. of the total cars handled. In cities the proportion of L. C. L. to the total is much higher than when the entire freight traffic of the country is considered, the L. C. L. tonnage of the United States being but 4.3 per cent. of the total tonnage, and the L. C. L. cars 12.7 per cent. of the total. This class of traffic is of greater importance than appears from its proportion of the total business, because it is high-class freight, carried at high rates, averaging from $40 to $50 per car, or from $6 to $8 per ton. Although the gross revenues thus derived are large, the cost of handling this class of business is very high, as terminal fixed charges and operating expenses, including charges absorbed, sometimes amount to $2 or more per ton ($1.50 fixed charges and 50 cents operation). The L. C. L. business is at present growing at the rate of about 5 per cent. a year. It therefore doubles every 15 years. This growth, although increasing gross earnings, in many cases causes great congestion and higher operating costs.

The usual freight-house layout is simple; a long, low, narrow building with a driveway on one side, and with from one to eight or more tracks on the other. Inbound houses are wider and are served by fewer tracks than outbound houses. A public street is often used for the driveway, but when this is done the street is usually widened from 10 ft. to 30 ft. that it may better accommodate standing teams. For small houses, and in locations where land is cheap, this is undoubtedly the most economical arrangement, but where land is worth from $5 to $20 or more per sq. ft., and where a house must be 800, 1,200 or even 1,800 ft. long to secure the necessary car capacity, the investment becomes increasingly heavy and the cost of operation high. Furthermore, when street and railroad grades are separated, the inclines between driveways and streets consume much valuable space and impose an added burden on teams and shippers.

The business in city freight houses may roughly be divided into two classes, that originating or terminating in the city itself, and transfer business, either between different roads or between different divisions of the same road. This transfer business is largely handled at the downtown freight houses. As the normal city outbound freight business is usually light in the morning hours, 50 per cent. being received after 3 o'clock in the afternoon, the transfer business can often be efficiently handled in these houses, without entailing increased facilities, because a more uniform distribution of work is obtained by handling transfer freight during the morning, and a higher loading per car and more "set out" cars are obtained by consolidating the transfer and city business. Many large roads, however, whose business is of sufficient volume to permit duplicate schedule loading, handle the transfer freight at transfer stations at break-up yards, near the outskirts of the city, leaving the expensive downtown terminals free for strictly city business. When the business of a road is sufficient to justify this separation it is undoubtedly advisable.

The high interest charges on downtown freight terminals may be illustrated by an inbound house in Chicago, 1,000 ft. long and 50 ft. wide, with a 40 ft. driveway on one side and two tracks on the other, occupying a total area of 120,000 sq. ft. The land is valued at about $16 per sq. ft. The total land investment then is $1,920,000, exclusive of the area occupied by leads. At 5 per cent. the interest charges are $96,000 per annum. The business handled is 50 cars per day or 15,000 cars per annum. The interest charges per car, then, are $6.40, or at six tons per car, $1.07 per ton. Adding to this the operating cost of 48 cents a ton, the total cost is $1.55. This is an actual example, and there are some thirty freight houses in Chicago alone whose charges may be considered somewhat similar.

For purposes of comparison the operating costs of a freight house may be divided between receiving, trucking, stowing, delivery, supervision and miscellaneous, the latter two being overhead charges.

These items vary with the size and length of the house; the longer the house, the greater the average trucking distance and the higher the cost of operation. The amount of trucking varies directly with the length of the house; the average trucking distance being approximately 53 per cent. of the length of the house. A study of the lengths and the costs of operation of 58 freight houses shows that the cost of operation increases with the length of the house, and a normal line plotted on a curve indicates an increase in cost of 1 cent per ton for every 35 ft. increase in length. It is clearly evident that any increase in the length of a house, although giving a greater car capacity, increases the cost of handling, not only of the additional business obtained, but of the entire business.

Any freight house of the usual one-story type which handles adequately the business offered, has four kinds of facilities and these of sufficient capacity and proper proportions, viz., car standing capacity, including suitable lead or approach tracks; platform area; platform frontage for teams, and team driveways.

From a study of several existing houses, and their relation to each other, it is noted, for instance, that in outbound houses the platform area varies from 213 sq. ft. to 570 sq. ft. per car standing room, the average being 247 sq. ft.; the team frontage per car standing room varies from 4.6 ft. to 19.2 ft., the average being 10.2 ft.; and the width of driveways varies from the street only to a 35 ft. private driveway. In most cases where the volume of business has reached, or is approaching the capacity of the house (and this is especially true in outbound houses), the particular facility which first feels the pinch of congestion is car standing capacity. This can be increased by the addition of more tracks against the house, although this decreases the team frontage per car, increases the cost of "spotting cars" and in inbound houses causes confusion between gangs of men working in different cars in the same "run"; by adding to the length of the house and its present tracks, which also increases the cost of operation; by handling the transfer business at outlying points, thus relieving the terminals of all except strictly city business; by a more rapid handling of the business; by the use of trap cars, or by "double-decking," that is, by placing cars on each side of the house on one level, and driveways on each side on another. Either of the first two methods increases the investment in land and also (slightly) in improvements.

In small houses (200 or 300 ft. long) the first method of

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enlargement is probably the best, i. e., to double the capacity of a house by doubling its length. In the case of an outbound house, the addition of more tracks against the house may increase the capacity at low cost. With inbound houses, however, it is often undesirable to add more tracks. In houses over 400 or 500 ft. long, an increase in length adds greatly to the costs of operation, and when more than four or five tracks are placed alongside a house, the cost of "spotting" cars and handling freight through them becomes high. In that case a duplicate house may be built. This is often done for inbound business, and offers no serious operating difficulties, but for outbound business would probably lead to many complications. This, of course, doubles the facilities, but does nothing to reduce interest charges or operating expenses. A point sometimes lost sight of is that each additional purchase of land for railroad purposes removes the potential commercial freight producing power of such area.

More rapid handling of freight through an inbound house would greatly increase its capacity; that is, the house could handle twice the business if the storage time before delivery could be cut in half. Or in an outbound house, if a more even flow of business during the day could be obtained, it might be possible to load two or three different "set ups" of cars daily, thus immediately doubling or trebling the capacity of the house. This, however, would involve a radical change in business methods on the part of shippers.

It is often possible to obtain a daily movement of cars 15 or 20 per cent. greater than the standing capacity of the house, by switching out loaded cars for points whose business requires two or more cars daily, but no great increase in capacity is thus obtainable. In most outbound houses the time required to place freight in its proper car after receipt from dray or truck is short. More rapid handling through the house by motor truck or other means has little effect on the capacity, and is justified only when it results in a saving in the cost of operation. In large houses, over 800 ft. long, motor trucks have proven economical, in some cases cutting the trucking cost as much as 40 per cent., because one motor truck and driver can handle a greater tonnage than one man with a hand truck. Motor trucks are most efficient when used as power for hauling loaded trucks as trailers to be dropped opposite the proper car. This method secures the maximum tonnage and mileage from the motor truck, by reducing the loading and unloading time to a minimum, and it enables a motor truck and two men to handle 60 to 80 tons per day, whereas two men with hand trucks handle only 20 to 30 tons per day.

One method of securing a high tonnage from a small area of downtown property is that which has been in use in Minneapolis and St. Paul for several years, where some roads provide no outbound houses, but use team tracks instead. Outbound freight is loaded indiscriminately into large box cars ("Jumbo" cars) at team tracks; the cars are pulled several times a day and taken to outlying transfer stations where the freight is transferred into schedule cars, the contents of "Jumbo" cars from several points being consolidated, thereby obtaining a high tonnage per car and very low interest charges, but adding the cost of loading the "Jumbo" cars (12 to 15 cents per ton) and some switching costs. This method, however, delays all freight received late in the afternoon until the following day.

Manufacturers have found it desirable to build factories of several stories instead of spreading one-story buildings over a much larger area, thus obtaining a more efficient use of ground and more efficient operation, by centralizing the plant. Similarly, by double-decking a freight house, with the tracks and driveways on different levels, but over the same ground area, it would seem that a railroad might obtain like results. Double-decking increases the car-standing capacity of a given piece of ground from 60 per cent. to 133 per cent. A comparison of the relative facilities of one and two-level developments shows that double-decking maintains about the same relations between the different facilities that exist in the one-story houses, for not only is the car capacity increased, but the driveway frontage and area, and platform area as well.

As, in such a house, freight must be handled between two levels, the cost of operation in some items is increased; but because the freight house is shorter and more compact, the operating cost in other items, especially the trucking, is reduced, often more than enough to offset the increase. Thus a two level house diminishes the investment in land; adds to the cost of the improvement; is especially feasible on side-hill locations or where grades are separated; saves the space sometimes used for inclines between streets and driveways; improves the street system, making the freight house more accessible; decreases the operating cost, by shortening the trucking distance and by centralizing the operating force, and adds to the operating costs the item of elevating or dropping freight.

The fact that double-decking will decrease the investment in land is apparent. In one terminal in Chicago where there are ten freight houses, handling over 700 cars a day, an average of 2,000 sq. ft. of ground is used per car standing room. There is much interference between teams and switch engines, and the approaches to some of the houses are long and circuitous. In a proposed two-level development of the same area it was found that only 1,300 sq. ft. would be necessary per car, a saving of 33 per cent., making possible an increase in the capacity of present holdings of 50 per cent. In this plan grades are separated, interference between teams and engines is prevented, and all houses become more accessible. The cost of the present one-story improvements was about $1 per sq. ft. The estimated cost of the proposed development was $4 per sq. ft.

In many cases where space is used for inclines between streets and the driveways of single-level freight houses, an excellent double-deck development may be designed that will increase the capacity as much as 150 per cent. over a single-story development. Often, also, double-deck developments may be designed to use as little as 1,000 sq. ft. per car standing room. This means an increased efficiency of from 60 to 100 or even 150 per cent. for a given piece of land and a corresponding decrease in the fixed charges of from 20 to 50 per cent. or possibly more.

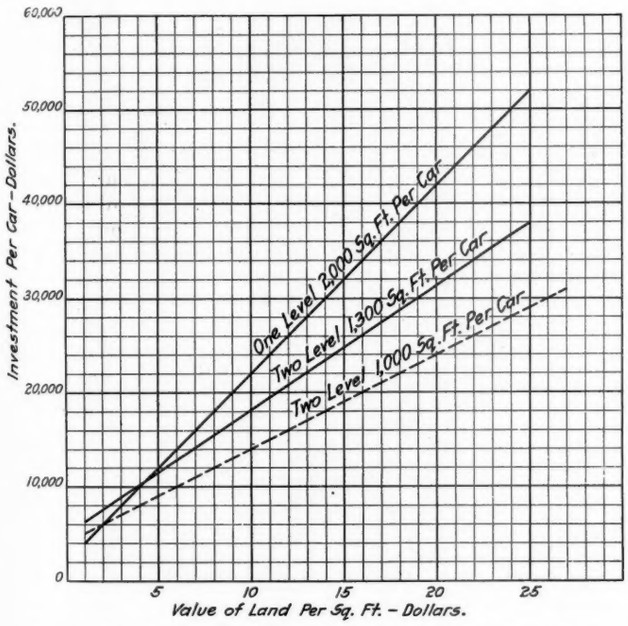
If 2,000 sq. ft. per car and $1 per sq. ft. for improvements be assumed as unit values for one-level houses, and 1,300 sq. ft. per car and $4 per sq. ft. for improvements for two-level houses, then curves may be plotted showing the total investment per car for different ground values, for one and two-level developments. Such a chart is shown in Fig. 1, the upper line showing the investment per car in one-level houses, the middle line the investment per car in two-level houses using 1,300 sq. ft. per car, and the lower line in two-level houses using 1,000 sq. ft. per car. Thus when land is worth less than $4.50 per sq. ft., a one-level house is the more economical, but when land is worth more than that a two-level house shows a saving.

Typical cross-sections show an increased capacity of from 60 to 130 per cent. possible in double-decking. In other words, a given car capacity may be obtained in from 40 per cent. to 60 per cent. less length in a double-deck than in a single-deck house. This would obviously result in a saving in trucking and in an increased efficiency in operation due to centralizing the working force. But this saving is not all clear gain, for in a double-deck house some means must be provided for handling freight between the two levels. This adds slightly to the cost of operation, and unless flexible, reliable, cheap, and efficient forms a serious objection to this type of house. Freight can be transferred between two levels by telphers (overhead cranes); by gravity (chutes); by mechanical conveyors (moving belts or platforms), or by elevators.

Where telphers are used the trucks are picked up by over-

head traveling cranes, and lifted or lowered through hatchways. In one house where telphers were installed it was found that this caused extra handling of all freight, as the telpher buggies had to be placed directly beneath the telpher runway. Hand trucks were therefore used to a large extent between the dray and telpher buggy, and between the telpher buggy and car. The telpher could handle only one buggy load at one time, the breakage of freight was heavy, and the cost of power was relatively great, as the load could not be counterbalanced. The telphers were unreliable, breaking down frequently, to the demoralization of the whole working force. The system was unsatisfactory and the house has been remodeled and elevators installed. It may safely be stated that while telphers are useful in special cases they are not suited to ordinary L. C. L. freight-house use, for they lack flexibility, are unreliable and more or less unsafe, and they are very expensive both in first cost and in operation and maintenance.

The second method, namely, the use of gravity, which is feasible when the cars are below the driveways in an outbound house, or above them in an inbound, would seem ideal, as gravity is free. A close study of operating conditions and



Comparative Investments Per Car of One and Two Level Cars

methods, however, shows many defects. Packages must be unloaded from a dray onto a truck, trucked to the chute, unloaded into it, reloaded into another truck at the other end, and trucked to the proper car. The many rehandlings are expensive, costing much more than the expense required to handle freight by elevator. Moreover, a chute is limited in capacity, it cannot handle packages of any great size or weight, or of odd shapes, it damages fragile goods and it is apt to cause congestion on the platforms around it.

Mechanical conveyors, inclined or perpendicular, would seem to be an efficient means of hoisting freight, but they are open to the same objections as chutes, namely, the necessity of extra handling, inflexibility, damage to freight, and congestion on the platforms. In factories or warehouses, where there is a steady flow of articles of uniform size and weight from one fixed point to another, chutes and mechanical conveyors between different levels have proven very efficient, but in a freight house where every conceivable variety of package must be handled from any one of several different points to any one of numerous other points, they are not satisfactory. It is cheaper and quicker to push a loaded truck on and off an elevator than to unload it into a chute or conveyor, and then reload the freight onto another truck at the other end.

The use of elevators is the only method found during this investigation which commends itself as generally suitable for use in freight houses. It lends itself particularly well to the handling of L. C. L. freight, as it involves practically no rehandling, and either a two-wheel truck or a four-wheel truck can be put through the elevator equally well, although the four-wheel truck is the better vehicle, as it has a greater carrying capacity. A trucker can handle 800 or 1,000 lb. on a four-wheel truck as easily as 200 or 300 lb. on a two-wheel truck. Elevators are flexible (need only be run when necessary), safe, reliable, can be designed so as to have a large capacity, and are cheap in operation.

The elevator should be wide enough to carry a loaded four-wheel truck or "dolly" and long enough to hold four or five of them in a row, the trucks being placed at right angles to the long side of the elevator, thus obtaining a high capacity per trip of the elevator and permitting the handling of articles of unusual dimensions. To fill these conditions the necessary dimensions would be about 8 ft. by 20 ft. Standard elevators are built with a speed of 50 ft. and 100 ft. per minute. Either speed is suitable, for the limiting point is not the time between floors, but the time at each floor, and unless the elevator is designed to permit rapid loading and unloading, its efficiency will be seriously crippled. The higher-speed elevators can make each trip quicker, but free movement on and off at each floor is more important than speed between floors. In order to obtain rapid handling, access to and from the elevator should be had from the long side, preferably from both, and at each floor. Observations of elevators in existing two-level houses have shown that such an elevator can be unloaded and reloaded in about 60 seconds.

The capacity per elevator can then be estimated between a minimum of 10 tons and a maximum of 60 tons per hour; a fair average per elevator per hour, in existing houses, has been found to be 20 tons, capable of being speeded up to 60 tons in rush periods. The cost of operation of elevators is low, averaging one to two cents per ton for power, and a little less for labor (attendant). In addition to the actual cost of operation, however, there is some extra trucking, as there is some lost motion.

It is estimated that these costs (in a well-designed house) will be:

Power and maintenance	1½ cents
Labor (elevator man)	1 cent
Delay to truckers	1½ cents
Total	4 cents per ton

An examination of existing freight-house elevators has shown this to be very closely correct. If the saving in the necessary length of a house is sufficient to reduce operating costs 4 cents per ton, the decrease in operating costs will balance the elevator cost and any decrease in operating costs due to any greater decrease in the length of the house will be clear profit.

A still further decrease in fixed charges is desirable, if possible. This may be obtained by building storage or warehouse floors above the freight house. This can be done equally well in one or two-level houses. It decreases fixed charges, and gives the tenants excellent shipping facilities. There is a danger in this practice, however, for while overhead storage or warehouse floors decrease the fixed charges, the requirements of tenants may be such as to seriously diminish the ultimate capacity of the freight house.

Street Railway Traffic in Buenos Aires.—The city government of Buenos Aires in the Argentine Republic has recently issued statistical returns for 1913 showing that street railway companies of that city carried over 409,000,000 passengers last year, as compared with 381,000,000 in 1912 and 355,000,000 in 1911.

THE INDIVIDUAL FUEL RECORD AND FUEL ECONOMY

By L. G. Plant

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An accurate and effective individual fuel record might fairly be considered "First Aid to the Coal Pile," yet the difficulties encountered in working up a reliable and wholly satisfactory record are such that this feature is often omitted from the fuel-saving campaign. Lack of facilities for weighing coal at chutes and the expense of maintaining an adequate clerical force to get out the individual statistics are perhaps the chief considerations that hinder work along this line.

Early in 1913 the writer outlined a method for compiling individual fuel records and organized, as an adjunct to the motive power department, a fuel bureau to handle the individual performance records of approximately 400 engineers and keep an accurate account of the fuel performance of each locomotive.

This experiment was developed on a southwestern system where oil fuel was largely used, and to the general interest and rivalry aroused by the publication in each roundhouse of daily and monthly performance bulletins, might in some measure be

Form 1698

SEABOARD AIR LINE

Performance Record

FREIGHT SERVICE BETWEEN

SAVANNAH and JACKSONVILLE

FEB. 1-15th 1914 — J.W. Small, Supt. Motive Power

ABOVE AVERAGE ENGINEER	Lbs. Coal Per 1000 Ton Miles	BELOW AVERAGE ENGINEER	Lbs. Coal Per 1000 Ton Miles
THROUGH FREIGHT			
Sanders G.W.	136	Lloyd D.T.	165
Barnwell	141	Lucas E.C.	171
Davis A.H.	144	Rogers E.M.	177
Wise W.P.	146		
Average thru freight Feb. 1-15th			162
" " " Jan.16-31st			167
LOCAL FREIGHT			
TRAINS 60 & 61			
Humphries	411	Landers D.A.	443
TRAINS 62 & 63			
Davis Jeff	366		
Average local freight Feb. 1-15th			407
" " " Jan.16-31st			328

Form 1698

SEABOARD AIR LINE

Performance Record

PASSENGER SERVICE BETWEEN

MONROE and ATLANTA

FEB. 1-15th 1914 — J. W. Small, Supt. Motive Power

ABOVE AVERAGE ENGINEER	Lbs. Coal Per Car Mile	BELOW AVERAGE ENGINEER	Lbs. Coal Per Car Mile
TRAINS 5,6,11 & 12			
Yates J.W.	16.5	Wilson J.A.	17.9
Jones E.C.	16.8	Wilson H.B.	18.8
Garrison J.	17.5	Tennant C.A.	20.2
Garrison A.	17.8	Shannon C.W.	20.7
Average thru trains Feb. 1-15th			17.8
" " " Jan.16-31st			18.2
TRAINS 17 & 18			
Game R.G.	28.7	Hicks E.C.	30.1
TRAINS 29 & 30			
Mears G.H.	18.1	Haighler C.A.	25.9
Hall G.H.	25.6	Cable J.B.	26.3
Average local trains Feb. 1-15th			25.8
" " " Jan.16-31st			27.1

Fuel Performance Record Cards for Freight and Passenger Locomotives; the Names of Enginemen Whose Fuel Performance is Better Than the Average are Printed in Red

ascribed the improvement in fuel efficiency accomplished during the first seven months in which this system was in effect. In passenger service the fuel consumption dropped from 1.2 gal. of oil per car mile to 1.1 gal., while in freight service the consumption was reduced from 18.0 to 14.0 gal. per thousand ton miles.

Owing to the reasonable accuracy with which the consumption of fuel oil on a locomotive can be gaged and to the fact that on a good steaming engine this fuel can be burned with nearly uniform efficiency, some interesting figures as to the relative efficiency of enginemen were obtained. On several divisions where enginemen were running pooled engines it developed that certain men invariably ranged from 15 to 18 per cent. above the average in efficiency, while another set of men appeared below the average with the same regularity though handling the same trains under identical conditions. Our records covering the performance made on each individual run were complete and all fuel measurements were taken at terminals and subject to check. It was observed that the runners making the best records were

Seaboard Air Line—A System for Obtaining an Individual Fuel Performance Record of Every Engineer and Each Locomotive

Number of engines operating in freight and passenger service..... 350
Number of engineers running in freight and passenger service..... 400

Outline of reports received by the Fuel Accountant, office of the Superintendent of Motive Power

Records kept by the Fuel Accountant

Fuel Performance Bulletins

	Passenger and Freight Form 1693 *Hostlers' Coal Book*	Passenger and Freight Form 772 *Coal Tickets*	Passenger Form 1696 *Daily Locomotive Performance Report*	Freight Form 1697 *Daily Locomotive Performance Report*	Passenger and Freight Form 1694 *Engine Record Book*	Passenger and Freight Form 1695 *Engineers' Record Book*	Passenger Form 1698 *Fuel Performance Record*	Freight Form 1699 *Fuel Performance Record*
Service								
Form								
	Reports on this form will be made up by hostlers handling engines at coal chutes at all terminals where engines are turned.	Coal taken at a coaling station located between terminals will be reported by engineers on this form.	To be reported daily by the car accountant. One sheet to be assigned to each division.	To be reported daily by the car accountant. One sheet to be assigned to each division.	The daily in- and out-bound records of every engine as reported on form 1693 are entered. Pages are arranged by engine numbers.	The individual record in pounds of coal per car or per 1,000 ton-miles for each trip made is recorded in this book under the engineer's name.	Issued semi-monthly by divisions to show the average record of each engineer. Records separated according to the character of trains handled.	Issued semi-monthly by divisions to show the average record of each engineer. Records separated according to the character of trains handled.
Information contained in form	The engine number and engineer, the time of arrival and departure, the tons of coal taken on arrival and the amount of coal in tank on departure.	Date. Train number. Engine number. Tons of coal taken. Name of station. Name of engineer.	1—Train number. 2—Engineer. 3—Engine number. 4—Miles run. 5—Time on road. 6—Car miles. 7—Tons of coal consumed. 8—Lb. of coal per car-mile.	1—Train number. 2—Engineer. 3—Engine number. 4—Miles run. 5—Time on road. 6—Thousand ton-miles 7—Tons of coal consumed. 8—Lb. of coal per 1,000 ton-miles.	Total— Coal burned. Time on road. Car or thousand ton-miles. Miles run. Avg. per trip— Coal burned. Time on road. Number of cars or tons in train. Miles run.	Engineer's average of coal per car or thousand ton-miles for each trip. Engineer's average record for each semi-monthly period, lb. coal per car or thousand ton-miles.	Engineers' records arranged in two columns so as to show those engineers above and those below the total average for the division and class of service.	Engineers' records arranged in two columns so as to show those engineers above and those below the total average for the division and class of service.
Cost of stationery per month	$3.50	$3.00	$0.80	$0.90	$1.00	$0.30	$0.25	$0.25
Clerical force required.....	None	None	One clerk in car accountant's office.		The fuel accountant, two clerks and a stenographer in the office of the superintendent of motive power.			Total $10.00
Cost per month.....	None		$75.00		$400.00			Total $475.00

The total cost of keeping the above records and issuing semi-monthly fuel performance bulletins, showing the individual record of each engineer on the entire system, is approximately one-fourth of one per cent. of the total cost of the fuel used.

those who exercised the greatest care and judgment in handling their trains, taking advantage of every grade and stop and avoiding, so far as possible, any situation which would cause an unnecessarily fast run. They were not always, as might have been expected, the advocates of the shortest cut off. If it is possible for some enginemen to maintain a 15 per cent. better fuel record than that attained by the average it seems reasonable to assume that after locating the sub-efficient units, some improvement can be effected in this class.

The motive power department of the Seaboard Air Line has recently adopted a similar system of individual records and it is estimated that the expense of maintaining this work is approximately 0.25 per cent. of the total amount being paid out for fuel. The accompanying table gives a summary of the system adopted, and one of the forms is shown in the illustration.

A distinctive feature in computing these records is that each trip is calculated separately as though it were a test run, the semi-monthly performance bulletins representing an average of the trip records made during the period. Only runs made under what are considered normal conditions are averaged; light runs, doubleheaders, etc., are eliminated for the reason that on such trips the fuel record made does not, for obvious reasons, fairly represent the efficiency of the engineman or the locomotive. As reports received show the tonnage of each train handled, the time on road, etc., we are in a position to know whether the average made on each trip, in pounds of coal per car mile or per thousand ton miles, is a representative average, and by exercising a little judgment based upon a knowledge of operating conditions, a reliable average record is obtained.

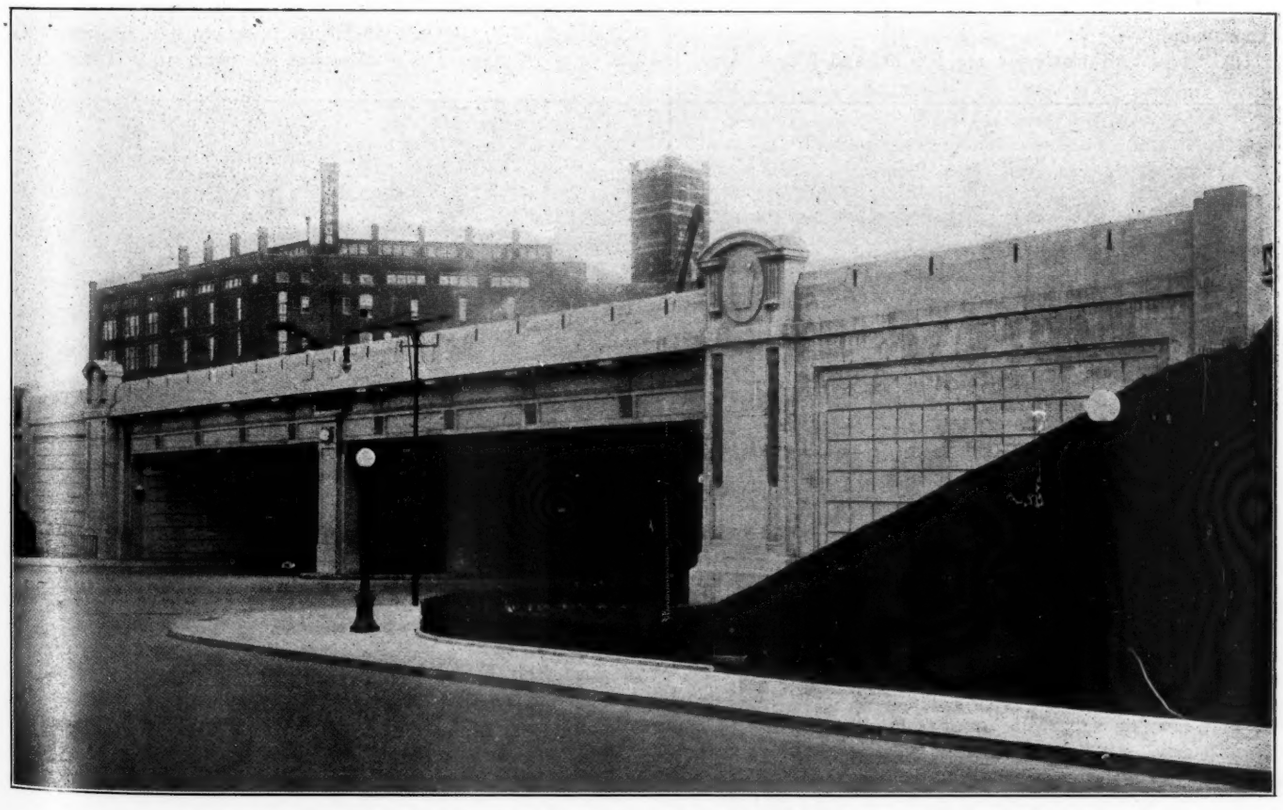
Performance bulletins covering freight and passenger service are issued semi-monthly for each division and so far as practicable the records are segregated according to the character of the trains handled and even to the type of locomotives in service. Copies of these bulletins are posted in all roundhouses, division officials each receive complete sets, and an additional copy with a letter of commendation is addressed to the engineer making the best record in his class.

PENNSYLVANIA'S IMPROVEMENTS AT NORTH PHILADELPHIA

In adding four tracks to its present four-track main line through North Philadelphia, the Pennsylvania Railroad is rebuilding and extending its passenger station facilities at that point, and the adjacent bridges over the Philadelphia & Reading and over Broad street. The old station building is being remodeled, a new power house and new island platforms built, the baggage and passenger tunnels extended, new platforms and waiting rooms for the Chestnut Hill branch provided, and the drives and sidewalks approaching the station relocated and rebuilt.

This station is an important one for through as well as local passenger business, for all through trains stop here, some of which do not enter West Philadelphia or the Broad street station. The Atlantic City as well as the New York local trains also pass this point and the Chestnut Hill branch leaves the main line here. In order to handle this passenger business efficiently, the main line tracks are being increased to eight through the station, giving four exclusively for passenger trains, all served by island platforms. A new signal tower and interlocking plant is being installed to control the crossovers at both ends of the station. The new bridges which are of steel girder construction, are encased in concrete for protection of the steel and also for ornamentation in the case of the Broad street bridge.

The arrangement of the station and approaches, the passenger and baggage tunnels under the tracks, the island platforms and waiting rooms, and the branch line platforms and waiting rooms, is clearly shown in the accompanying plan. The old station, which is of brick construction, had a waiting room and ticket office on the track level floor, which was reached by a broad driveway from Broad street coming up on a steep grade. The passenger subway was entered from the basement under this floor, which was reached by stairways. In the present improvement, the level of the ground adjacent to the building is being

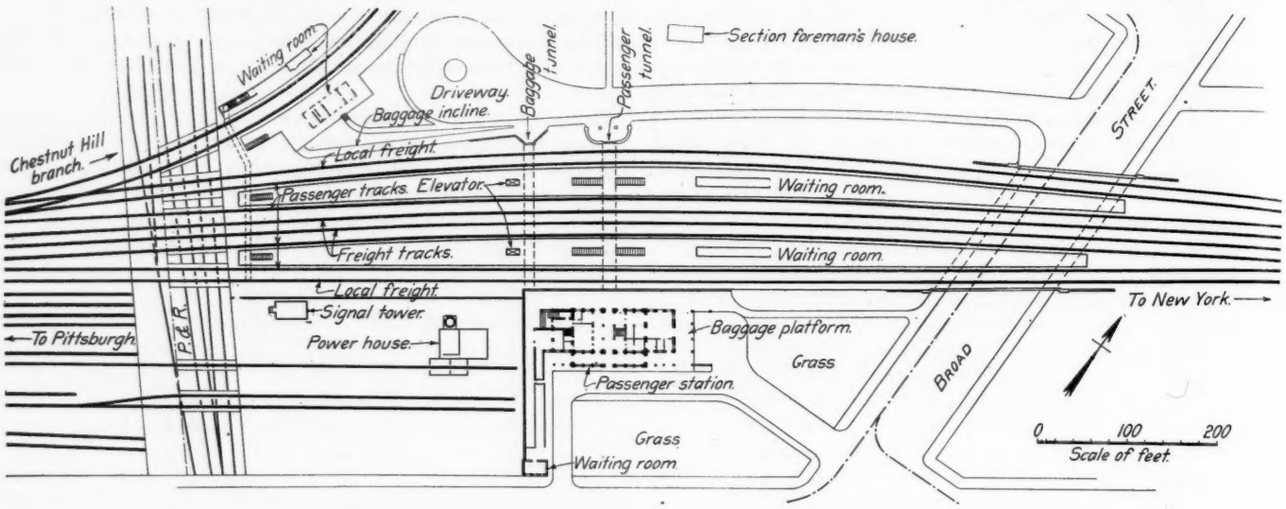


Steel Girder Bridge with Ornamental Concrete Casing Over Broad Street at North Philadelphia

lowered to about the level of the old basement floor, thus eliminating the steep grade in the driveway. A ticket lobby, ticket office, baggage room, telephone and telegraph booth and news stand will be located on this ground floor with the main entrance adjacent to the driveway on one side and the entrance to the passenger subway on the other, making it possible for patrons to alight from carriages at the station, purchase tickets and proceed to the island platform without first going up to the track level and then down to the passenger tunnel. The main waiting room, a lunch room and men's and women's waiting rooms will be located on the second, or track level floor. A broad stairway will connect these two floors. The power and heating plants will be removed from the station building and located in the new power house to be built west of the station. The present platform and shelter on the track side of the station will be removed and the exterior of the building renovated.

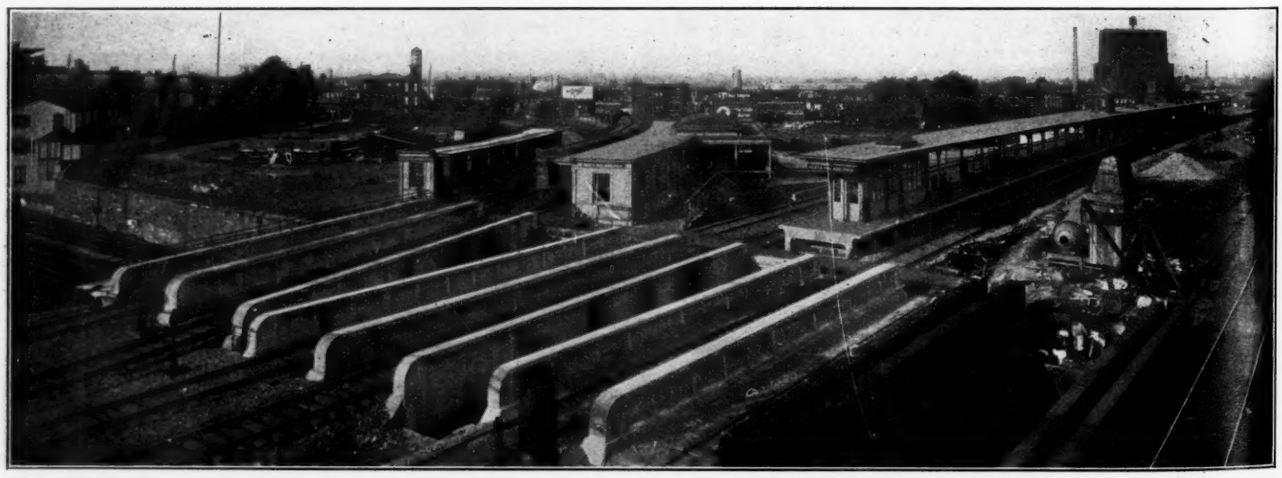
The two island platforms are 950 ft. and 990 ft. long, respectively, and have a maximum width of 30 ft. They are of concrete construction supported at the elevation of the car floors on four rows of concrete columns spaced 10 ft. center to center in each row. An 8 in. concrete floor slab is carried on longitudinal and transverse beams over these columns. The surface of this platform is sloped 0.0142 in. per ft. from the center and has a 1½ in. wearing coat of asphalt. The shelters over the platforms are 700 ft. long and are of steel construction with a wooden roof covered with slag.

The passenger tunnel is 16 ft. wide, covered by a 2 ft. concrete slab and the baggage tunnel is 10 ft. wide, the roof slab being 1 ft. 4½ in. deep. An electric baggage elevator is provided to connect this subway with each island platform. The end of the passenger subway opposite the station which opens out on a drive leading to Broad street is covered by an ornamental marquise of metal and glass. All retaining walls are finished with horizontal scoring on exposed faces, and all slopes along the drives are neatly sodded.



General Layout of North Philadelphia Station, Island Platforms, Subways and Branch Line Platforms

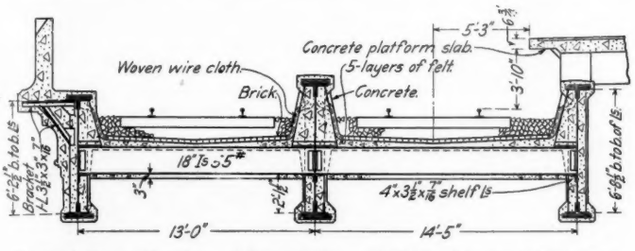
The 10-track bridge over the Philadelphia & Reading is a single span through steel girder structure with solid deck, all steel being encased in concrete for protection. The Broad street bridge which carries eight tracks and two platforms is a half through steel girder structure of two spans. The street is 113 ft. wide at right angles to its center line, including two 13 ft. sidewalks. The tracks cross the street at an angle which varies from 54 deg. 38 min., to 59 deg. 45 min., making the total span under copings vary between 133 ft. 5 7/16 in., and 141 ft. 4 7/16 in. The girders are supported by concrete abutments and a row of steel columns on the street center line, making the girder lengths 70 ft. 8 in., to 75 ft. 10 in. The clearance above the street is 16 ft. The solid floor is supported by 18-in., 55-lb. I-beams spaced 21 in. center to center and con-



General View of Bridge Over Philadelphia & Reading, One of the New Island Platforms and the Chestnut Hill Branch Waiting Rooms Taken During Construction

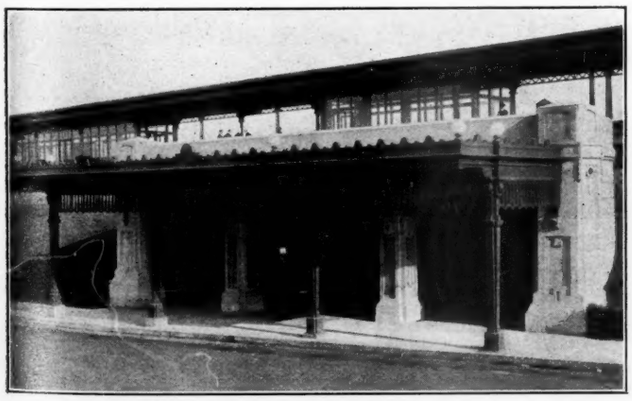
nected by angles to the girder webs. The concrete floor slab extends 3 in. below and a minimum of 2 in. above these beams. This concrete is waterproofed by the membrane method, using five layers of felt and compound with a protective layer of brick. Woven wire cloth is used to reinforce the concrete carried up over the girders. The two island platforms are carried across this bridge, one on each side of the center group of four tracks, by a concrete beam and slab construction resting on the tops of the adjacent girders.

The ornamentation of this structure was an important consideration, and it was very effectively accomplished in the design of the abutments and the treatment of the concrete protection on the end girders and columns. A "U" type abutment is



Typical Cross Section of Broad Street Bridge Showing Concrete Facia Girders and Method of Supporting Concrete Platforms Across the Bridge

used with the fill spilling around the wing wall at one end of the bridge. This type is easily harmonized with the rest of the structure as the wing walls form a continuation of the girder line and the same coping and parapet walls can be carried straight for the entire length of the face. The surface of the wing walls is laid out in one large panel broken by horizontal and vertical scoring. Wide pilasters finish off these abutments at the building lines, the ornamentation of these pilasters being somewhat ornate. Two deep, narrow vertical panels in each shaft are set with conventional designs in relief, which are molded of concrete and secured in place with steel dowel pins. The cap bears a large keystone, the company's emblem, which was cast in place. The faces of the columns and the lower part of the end girders are paneled and separately molded con-



Marquise Over End of Passenger Subway

crete forms are set between the girder panels and on the brackets under the girders. These end girders carry steel brackets, which are enclosed in concrete, forming a continuous overhanging coping surmounted by a concrete parapet wall. A bronze date plate occupies a central position on the face of the girder and frosted electric light globes are located along the face of the abutment over the sidewalks and at the top of each end column in the center row. The face concrete was made of Portland cement, sand and Port Depont crushed granite to pass a ⅜-in. screen. The surface was finished by bush hammering.

This entire improvement is being handled by the Pennsylvania engineering department under A. C. Shand, chief engineer. It is directly in charge of E. B. Temple, assistant chief engineer, and W. L. Ziegler, engineer of construction. The design of the steel work was made by H. R. Leonard, engineer of bridges and buildings, and William H. Cookman was the architect. The design of the Broad street bridge was approved by the chief engineer of the department of public works and the art jury of the city.

ANNUAL REPORT OF THE BUREAU OF EXPLOSIVES

The Bureau for the Safe Transportation of Explosives and other Dangerous Articles has issued the seventh annual report of Col. B. W. Dunn, chief inspector, for the year ending December 31, 1913, and it shows that 6,000 packages had to be condemned as unsafe, a striking testimony to the usefulness of the organization.

The membership of the bureau now comprises 326 railroad companies, 11 steamship companies and 10 express companies; and 62 manufacturing concerns appear as associate members.

The total amount of losses by accidents in the transportation of explosives during the past year was $22,048, and of this $18,000 represents accidents not in actual transportation, but to goods on carriers' property awaiting removal by the consignees. In the year 1907, when the bureau began its work, these losses amounted to nearly half a million dollars. In that year, the number of persons killed by explosives in transportation was 26, and of injured, 53; in 1913, there were no persons killed and only 4 injured.

Accidents in transportation of explosives by other than common carriers have been inquired into by the Bureau and there is a statement to the effect that, during the past year, four accidents of this kind have occurred, in which 57 persons were killed and there was a money loss of nearly a million dollars. An explosion on a steamer in Baltimore harbor, March 7, accounts for a large part of this destruction. Accidents in the manufacture, storage or use of explosives during the year caused 139 deaths and property loss to the amount of $83,367.

Fires occurring in the transportation of articles classed as dangerous, other than explosives, numbered, in the year 1913, 205; property loss, $276,078. Accidents not involving fires, such as spilling of acids, numbered 216, and the property loss was $5,282. Fires occurring in transportation of articles not classed as dangerous, numbered 61; property loss, $53,120.

The chief inspector has recommended to the Interstate Commerce Commission a number of revisions of the regulations. He proposes that the regulations shall apply to the shipment of material and supplies belonging to the carriers; that carriers be required to forward shipments promptly; that the word "Explosives" be shown not only on cars, but on waybills; that in coupling cars containing explosives, the speed must not be over two miles an hour, and that after January 1, 1915, the use of wooden kegs for shipment of inflammable liquids be further restricted.

Colonel Dunn urges that railroad employees be required to attend the lectures given by the inspectors of the Bureau, giving instruction concerning the handling of explosives, etc.; but care must be taken not to exercise unnecessary pressure, indiscriminately. Lantern slides are used in lectures, but attention is called to the fact that if too much attention is given to the element of entertainment, unnecessary expense will be incurred. The use of moving pictures would be very costly, but it is expected that, with the aid of manufacturers, who can get a little advertising out of a moving-picture show, one or more films will be in use before the end of this year.

Two of the Bureau's inspectors devote their entire time to the inspection of express business and to the delivery of lectures to express employees and shippers. Shippers of inflammable articles have made unlawful use of the parcel post in order to

evade the strict rules prescribed by the express companies. Mr. Dunn has complained of this to the postoffice department and the dangerous practice is to be stopped.

Colonel Dunn advocates the imposition of high rates for storage of explosives; the rate should be high enough to be a real penalty.

The work of the Bureau is summed up for the year in the statement that 9,027 inspections had been made of stations; 1,670 inspections of cars in transit containing explosives; and that the total number of boxes and kegs of explosives condemned as unsafe was 5,999. Nearly all of these packages contained high explosives, and the total number is 802 more than the number reported in 1912.

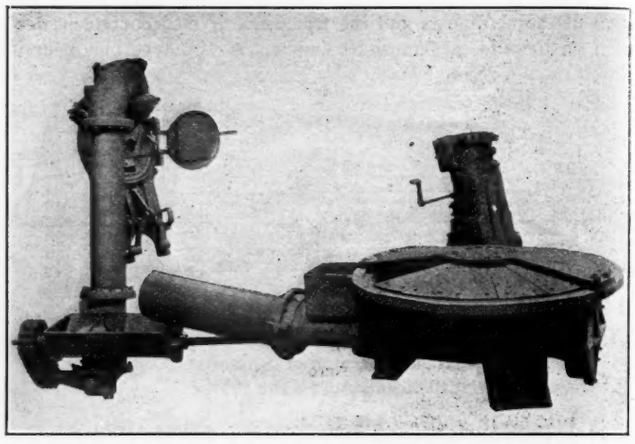
All of the large express companies now belong to the Bureau. The Bureau now employs a chief inspector, three assistant chief inspectors and thirty traveling inspectors. The president of the Bureau is N. D. Maher, vice-president of the Norfolk & Western.

IMPROVED HANNA LOCOMOTIVE STOKER

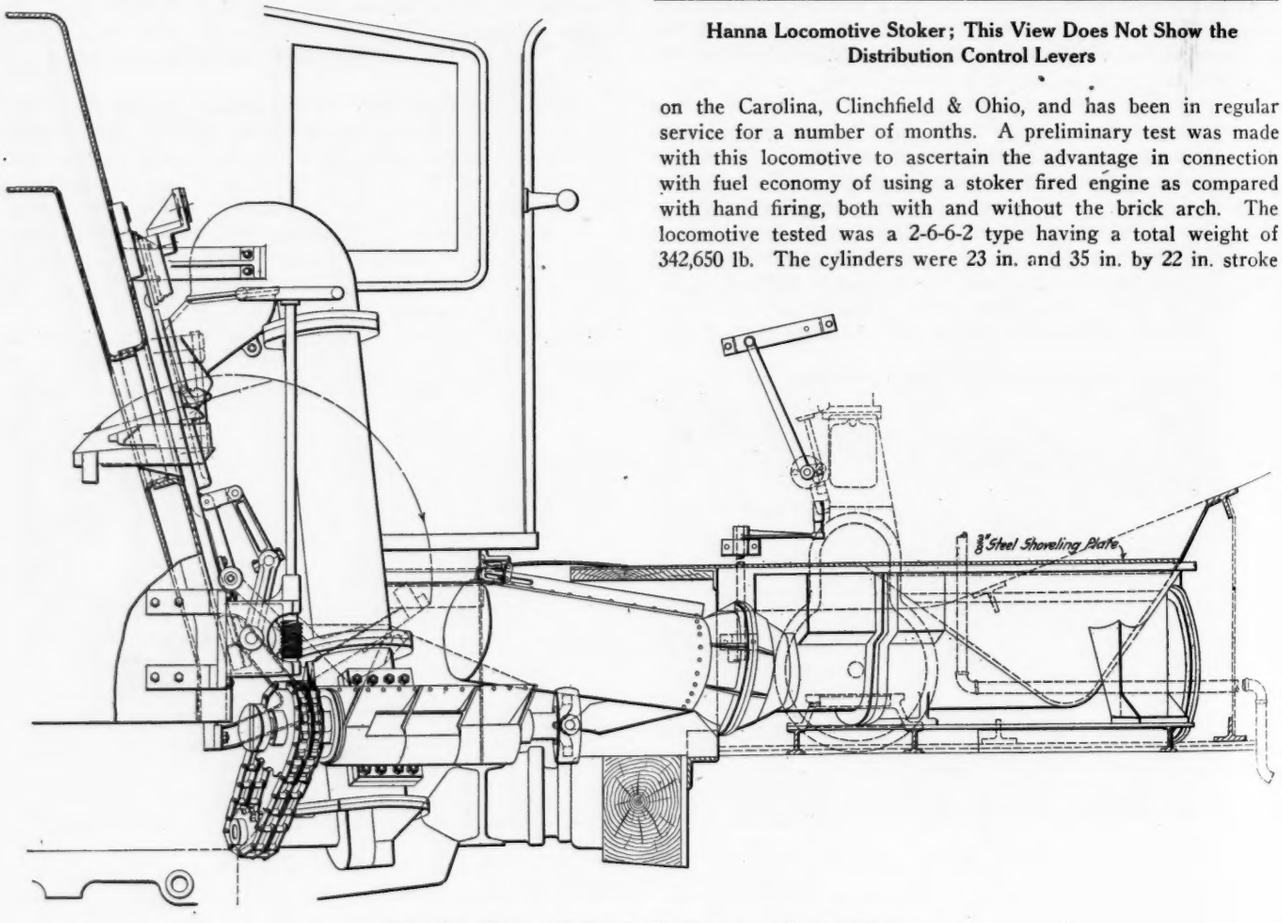
The Hanna locomotive stoker was arranged originally so that it was necessary for the fireman to shovel the coal from the tender to a hopper and the stoker simply delivered it to the firebox and distributed it over the grate area. A number of machines of this kind were applied and successfully operated for some time, but owing to the requirement of shoveling the coal by hand, it did not receive an extensive application. One of the original stokers, however, which was fitted to a large Mallet locomotive on the Carolina, Clinchfield & Ohio, has remained in operation during the past three years and has successfully fired this large locomotive during that time.

The Hanna Locomotive Stoker Company, Mercantile Library building, Cincinnati, Ohio, realizing the necessity of having the stoker convey the coal from the tender as well as to distribute it in the firebox, has redesigned the machine to accomplish this object. The improved stoker maintains the original construction arrangement and operation so far as the distribution of the coal after it reaches the fire door is concerned. In other respects, however, it has been altered as is shown in the accompanying illustrations.

One of the new machines was applied to a Mallet locomotive on the Carolina, Clinchfield & Ohio, and has been in regular service for a number of months. A preliminary test was made with this locomotive to ascertain the advantage in connection with fuel economy of using a stoker fired engine as compared with hand firing, both with and without the brick arch. The locomotive tested was a 2-6-6-2 type having a total weight of 342,650 lb. The cylinders were 23 in. and 35 in. by 22 in. stroke and the engine has 57 in. drivers. It carries a steam pressure of 200 lb. and develops a tractive effort of 70,640 lb. A 6 in. diameter exhaust nozzle was in use.



Hanna Locomotive Stoker; This View Does Not Show the Distribution Control Levers



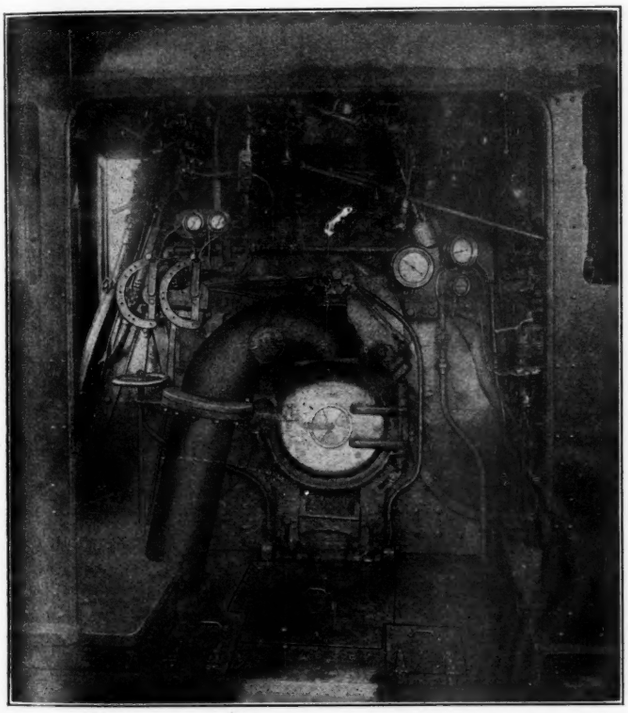
Complete Hanna Stoker in Position on a Locomotive

In the test without the brick arch over a .5 per cent. grade, trains of about 3,500 tons were drawn. The average speed in

miles per hour for the hand fired was 8.44 and for the stoker fired 7.4. The most interesting figure of the test was the total evaporation per pound of coal from and at 212 deg.; this for the hand fired was 7.95 lb. and for the stoker fired was 8.54 lb., an increase of .56 lb. or 7.39 per cent. Similar tests with the brick arch gave an equivalent evaporation for hand firing of 8.94 lb. and for stoker firing of 9.52 lb. This is an increase in favor of the stoker of 6.72 per cent.

In the new design of stoker there is a small vertical, two cylinder, reversible steam engine located on the tender and placed on the right side in the space usually occupied by tools. The flat portion of the coal space is replaced by a conical hopper, at the bottom of which is the screw conveyor. This allows all of the coal in the tender to feed to the conveyor by gravity. In the illustrations this hopper is shown as covered with removable strips, but in practice they were found to be unnecessary and have been removed.

The steam engine drives the conveyor through a clutch and



Cab of a Locomotive Equipped with a Hanna Stoker

bevel gears connected to a shaft which extends diagonally across under the tender deck and parallel to the screw conveyor. This shaft connects to the conveyor on the tender by means of spur gears at the back end. The tender conveyor partially crushes the coal against knives located at the outlet from the hopper and carries it forward toward the left side of the locomotive to a point above the end sill of the tender frame. Here there is a ball and socket joint and a sheet iron pipe through which the coal is crowded and made to fall to the hopper of the feeding conveyor.

At the forward end of the shaft which drives the tender conveyor there is a universal joint and it continues and drives a short section of spiral conveyor which is arranged with l spirals on either side of a cover plate that is directly opposite the opening to the vertical conveyor. This short section of conveyor is employed for the purpose of feeding the vertical. An extension of the shaft beyond the feeding hopper, through a double sprocket wheel and short sections of chain, conveys the power to a shaft underneath which in turn drives the vertical conveyor by a bevel gear.

The vertical conveyor is enclosed in the cast iron pipe shown in the illustration which passes through the cab deck on the left hand side and close to the boiler head. At the top of this pipe is a short elbow section and the coal is forced through this by the pressure from behind and falls into the distributing apparatus by gravity.

The section of the stoker carrying the distributing wings is arranged to latch to a swinging ring hinged on the regular fire door pin, allowing this to be swung open for observation, hooking or even hand firing as though it was a regular swinging door, while at the same time automatically disconnecting or connecting the wing controlling mechanism through a slot and pin. If it is desired to have the full opening of the fire door for any purpose, this wing section can instantly be detached from the ring and laid aside by one man and the section of the distributing apparatus which contains the steam jets is arranged to swing beneath the deck by an operating wheel in the cab. The deck opening is covered by a sheet iron plate. This allows the regular fire door, which is in place on the right hand side, to be closed against the ring and used in the ordinary manner. The pipe coming up at the left does not in any way interfere with hand firing.

The distributing apparatus is unique and consists of two sets of jets, there being seven arranged in an arc, each being at the end of a cast iron finger. Below these is a very thin narrow opening through which a flat jet of steam emerges. Above these jets is a ridge plate slanting downward and on either side of this are wings swung from hinged connections arranged perpendicular to the planes on either side of the ridge plate, so that the bottoms of the wings make a contact with the faces of the ridge for their full stroke. It will be seen that with this arrangement if the right wing is at the top of its stroke and the left at the bottom, a trough is formed which discharges all of the coal to the left side. If each of the wings is half way down two troughs are formed and the coal is distributed equally to both sides. The coal, after passing into these troughs is dropped in front of the steam jets and the fine particles will pass between the fingers and be caught by the flat jets below. This is normally maintained at about 20 lb. less pressure than the jets emerging from the fingers and the fine dust is thus discharged to the firebox underneath a stronger jet which tends to hold it down until it is consumed. The larger pieces, however, strike the fingers and are caught by the jets at the ends and the pieces are thus blown to various parts of the firebox, depending on the direction of the jet which catches each. The distribution is thus controlled by the wings, which are very ingeniously operated and will permit a definite amount of coal to be fed to different parts of the firebox continuously.

The adjusting levers for these wings are shown at the left side in the view of the interior of the cab. By moving the handles along the arc, the travel of the wings on either side of the ridge plate is controlled and these wings can be made to continuously follow any determined path. If, for instance, it is found that the locomotive is burning stronger on the right side than on the left, the right hand wing will be arranged to travel from the bottom of its stroke two-thirds of the way up and back again while the left hand wing will be arranged to travel from a point two-thirds down, to the top and back. In this way a greater proportion of the coal will be distributed on the right hand side and a smaller proportion on the left. This adjustment, together with the control of the pressure of the steam in the jets, allows great flexibility and it is possible to so adjust them as to suit the burning conditions of any locomotive.

At present a Hanna stoker of this type is also in operation on a 12-wheel locomotive on the Norfolk & Western and the preliminary runs are reported as being very successful.

Railway Construction in India.—Approval has been given to the project for the construction by the South Indian Railway of a branch meter gage line from Podanur, a station on its line to Pollachi, a town about 25 miles distant in the southwestern part of the Madras Presidency, near the Malabar coast. This railway will open up an exceedingly fertile and productive area, and will be known as the Podanur-Pollachi Railway.

RAILWAY ORGANIZATION*

I am proud to be a railroad man because in peace time the railways are the best managed, the best administered undertakings of the ancient or modern world. I say in peace time because in war time individuals rise to greater heights when embodying the aroused spirit of a people, and are therefore capable of a more concentrated and sustained effort. I believe in righteous war because the existence of all nations rests finally upon the law of force.

Is it a happen so, a meaningless coincidence, that the greatest military nation, Germany, is today the most efficient industrially? Refuting popular but mistaken belief, it is a fact that the military type of organization is the most efficient. Military methods are the most efficient because when properly applied, they recognize the importance of the individual, however humble, as the indivisible, indestructible unit of society. The military type demands that early convergence of authority which breeds a habit of individual responsibility making for the highest efficiency.

Organization is a branch of a larger subject, sociology, the science of human nature. Organization seeks to secure to any undertaking the highest efficiency through the best arrangement of the human parts of the administrative machinery. Organization thus seeks to emphasize the strong qualities of human nature and to minimize its amiable failings. A constitution adopted by a people imposes checks against unbalanced conduct of public affairs by defining the scope of authority of departments of government. Remember that government is the largest of corporations, all citizens being shareholders. A chart of organization adopted by a corporation likewise seeks to define authority, to locate responsibility and to divide the undertaking into logical and efficient groups of workers. In the beginning such divisions of labor are usually self suggesting. As the undertaking grows its operation usually becomes more complicated and difficulty is encountered from departments overlapping or conflicting.

So wonderful and so rapid has been the growth of the modern corporation that frequently its interior organization has been the result of haphazard expedients rather than of scientific evolution. As competition becomes keener or regulation more restrictive the margin of profit narrows and cheaper production results through economies in operation. These economies come from better organization and wiser administration. What passes for good organization is often poor organization offset by splendid administration.

The science of organization seeks to minimize the effect of class consciousness, to give the unorganized trackman the same relative consideration as the superfluous member of the organized "full" train crew. The faulty organization of railways into unnecessary semi-independent departments has made possible economic waste and the extremes of unreasonableness imposed by unbalanced labor unions. It is unfair and unjust to blame present labor unions for irksome conditions. The fault lies with the earlier managers who yielded to the natural temptation to ultra specialization of function as the easiest way. On the first railways, the trackman became a brakeman, and perhaps the brakeman a fireman, but always a company man. Too soon there came departments with their jealousies, the master mechanic honestly believing that the fireman employed in the mechanical department must be an entirely different kind of human being from the brakeman employed by the trainmaster in the transportation department. The methods adopted were natural and pardonable, but indefensible in principle, because in violation of the fundamental that true composite efficiency demands an early convergence of authority and responsibility. Wherever specialization of function is allowed to run rampant, unnecessary departments are created and the point of convergence of complete authority is pushed farther and farther toward the top. Each specialist seeks to create a department and report to the big boss. We all believe in specialization. Where we differ is as to the point where true specialization ends and over-specialization begins.

Where so many departments exist there are not enough officials to go around. Authority is then delegated to chief clerks and to foremen. Administrative authority is filtered from a three hundred dollar superintendent through a one hundred and twenty-five dollar chief clerk to a two hundred dollar trainmaster. We would not construct a mechanical plant with pressure from a 3 in. main going through an inch and a quarter connection to reach a 2 in. lateral. An electrical plant steps down its potential through graduated transformers or conductors. The most pernicious practice on railways is in permitting the chief clerk to sign the name of the boss. A man's name is his birthright. His signature is his patent of enlightened manhood. For one man to sign another man's name is dishonest in conception and demoralizing in administration. It has recently been demonstrated on sixteen hundred miles of railway that all departments can be run more efficiently by providing enough officers to preclude the necessity of one man's ever signing another's name. Among the amiable failings of human nature which should be checked by proper organization is that every official flatters himself that he himself handles all important matters and that his chief clerk never causes friction with officers below. If my fairy godmother would grant me two wishes, one would be that no person should ever be permitted to sign the name of another. The other would be that every person should learn to do well at least two things, and as many more as his abilities and opportunities permit. Nations are relatively strongest in the pioneer stage; then every man's first thought is unconsciously not to find how much he can avoid by claiming that specialization assigns the task to some one else, but rather to undertake everything possible for the common weal.

*Abstract of an address by Major Charles Hine at the dinner of the Central Railway Club, at Buffalo, N. Y., on March 12.

THE RATE ADVANCE HEARINGS

The Interstate Commerce Commission, sitting at Washington this week, heard the representatives of the railroads who presented further testimony in support of their request for approval of a general advance of 5 per cent. in freight rates. As a preliminary to the hearings the commission, through Mr. Brandeis, gave out on Saturday a statement showing results of investigation of various railroad companies' books, in which it was found that excessive terminal allowances had been made at New York, Philadelphia and other places. This statement dealt with free storage and unloading and loading allowances. The following is an abstract:

Discrimination Through Free Service.—Shippers at Philadelphia receiving flour, hay, grain, etc., on team tracks or on their private sidings in carload lots must perform at their own expense the service of unloading. Those who prefer to have their freight delivered to warehouses alongside the railroad must ordinarily pay the warehousemen for unloading and for such storage as they may get from the warehouse company. Such persons, however, who choose to patronize certain warehouses designated by the Pennsylvania Railroad have their freight unloaded from the cars, stored four days, and then carried to the wagon free, the expense being borne by the Pennsylvania Railroad. This free service cost the Pennsylvania at Philadelphia through three of the four subsidized warehouse companies $282,261 in the year ending June 30, 1913.

Shippers who receive their freight on team or private side tracks are discriminated against in that they pay to the railroad company as much without that service as the shippers who receive their freight through the subsidized warehouse companies. The discrimination in favor of certain shippers is two fold:

First—In having their freight unloaded and loaded on to the tracks without cost to them.

Second—In having through the warehouse four days' free time, instead of two days' free time, the ordinary period allowed to shippers who take their shipments on public team tracks or other private sidings.

Examples of the effect of this free service on the revenue of the road are:

Out of $125.26 paid for hauling four cars of flour from Buffalo (442 miles) the road paid the Merchants' Warehouse Company $32.16, or 26 per cent. of the revenue.

For hauling one car of grits from Geneva, N. Y. (223 miles), the railroad received $33.96 and paid the warehouse company $10.61, or 31 per cent. of the revenue.

(3) For hauling one car of hay from Geneva, N. Y. (223 miles), the railroad received $33.96 and paid the warehouse company $10.61, or 31 per cent. of the revenue.

Buffalo.—Free services in loading and unloading carload freight similar to that at Philadelphia were also found to exist at other places. Thus on a shipment of 20 cars of cottonseed oil in barrels from Ivorydale, Ohio, received and unloaded at a Buffalo warehouse over 35 per cent. of the total revenue was absorbed in the unloading and other terminal services at the points of origin and destination.

Free Transportation on the Pennsylvania.—A lot of 30 cars of iron pyrites arriving at Girard Point, Philadelphia, by vessel were shipped from there to Marcus Hook by the Pennsylvania Railroad at a rate of 20 cents per gross ton. The amount paid the Girard Point Storage Company for taking the iron pyrites from shipside at Girard Point and loading into the cars at Girard Point was 20 cents per gross ton; consequently nothing was left to pay for the railroad's service in transporting. In fact the Pennsylvania paid out to the storage company more than it received, for in addition to the 20 cents for each ton loaded on the cars, it pays also $714.30 a month for the use of the storage company tracks and the salary of billing clerks. Prorating these payments over the year's business of the Pennsylvania with this storage company, a further sum of 6.6 mills per ton is attributable to this particular shipment of 30 cars of iron pyrites. In other words, for the pleasure of transporting 1,314 gross tons of iron pyrites free the railroad paid a bonus of $8.67.

In another case, dealing with a shipment of 25 cars of imported iron ore from Girard Point to Pottstown, Pa., the payment for loading constituted 47 per cent. of the total freight charges. In a third case record was kept of 54 cars of wheat ex-lake from Buffalo to Philadelphia. The total freight revenue was $3,734.03. Of this $1,743.88, or 46.7 per cent., was paid out for terminal services, with the result that the gross freight rate per ton per mile of 4.17 mills was reduced to but 2.22 mills of actual revenue.

Free Services on the Erie.—The total revenues of the Erie earned on business destined to or originating at New York harbor are about 25 per cent. of the Erie's total freight business. The freight rate on a large part of all freight for New York harbor is the same to Jersey City and Weehawken as it is to Manhattan or Brooklyn, and it is declared that discrimination is practiced against Jersey City and Weehawken. They must unload freight within 72 hours or demurrage accrues. But freight for points in New York City proper or Brooklyn (lighterage free) has these privileges: (1) ten days' free storage if for domestic consumption; (2) 30 days' free storage if for export; the traffic which enjoys this free storage enjoys also the privilege of being unloaded and later reloaded at the carrier's expense. The expense of this service has been investigated. Data have been collected for 18,153 cars, which were received, loaded and unloaded at the Erie's warehouse at Weehawken during the calendar year 1913. The expense of the mere labor cost in unloading and loading was $5.53 a car for an average loading of less than 22 tons. Adding the overhead charges, maintenance, depreciation, taxes and interest on the warehouse, the cost per car for loading, unloading and storing is near $8.

There is in addition to this, of course, the cost of lighterage. That cost, including interest and depreciation on marine equipment, is at least about $17 per car, making the total cost per car on these 18,153 cars for this terminal service at least $24 per car. These 18,153 cars contained package freight. On only a small part of them was payment made for terminal service.

Free Services at Baltimore.—The commission also undertook to ascertain whether the charges for storage services supplied by the Baltimore & Ohio at Locust Point, Baltimore, for merchandise in transit were remunerative. Record was kept of 21 cars of tobacco from Virginia points to St. George station, New York City. The total revenue was $631.98, of which $288.80 was collected for storage and labor at Locust Point. The cost of the latter services, however, was $781.12. On 29 cars of feed and meal from Ohio, Indiana and Illinois for export from Baltimore the total revenue was $1,362.86. Special services at Baltimore absorbed $647.03, leaving a ton mile revenue of 1½ mills.

The Free Services at New York.—The depletion of revenues by the carriers through free unloading, storage, and similar terminal services is even more marked on certain shipments, large in volume, to New York City. In 1913 over 6,000 carloads of flour were shipped over the West Shore to Weehawken. The commission's examiners took the records of 25 of these cars. The average loading was a little below 25 tons each. The aggregate revenue was $1,092.87. The approximate cost of certain defined services was $904.13; or in other words, nearly 83 per cent. of the gross revenue was consumed in these terminal charges. The apparent rate per ton mile on this shipment was 4 mills. The actual amount retained after deducting these specific terminal expenses was .7 mills. But if there be charged against the shipments also the per diem paid for foreign cars, the whole revenue appears to be consumed without leaving one cent for hauling the 428 miles from Buffalo and the maintenance of the tracks on which they moved.

After an average delay at Weehawken of 4.44 days, the cars were unloaded at the carrier's expense. Then the merchandise was stored at Weehawken, again at the carrier's expense. After a short period of time the merchandise, at the carrier's expense, was taken from the warehouse and a part of it reloaded into the cars and a part loaded directly into boats. That which was loaded into cars was, at the carrier's expense, carried to and put upon a float; and at the carrier's expense, floated across the river. That which was delivered on the lighter was likewise, at the carrier's expense, carried to some pier, and if a public pier, there transferred at the carrier's expense onto a pier; and later to the consignee. The unloading and loading at Weehawken cost the railroad $6.20 per car. The lighterage or floating, $17.26; the extra switching, $3.50 a car. And an important part of this expense is represented by the warehousing privilege granted free by the railroads; 10 days when for domestic delivery, 30 days when for export, 60 days when for export on through bill of lading. These amounts do not include any payment for car hire. All of these cars were foreign cars, on which there was paid to the foreign owner 45 cents a day or $49.95 for the time they lay at Weehawken under load; and $34.20 for the time in transit.

STATEMENT OF CLIFFORD THORNE

Clifford Thorne, of the Iowa State Railroad Commission, appeared on behalf of the commissions of his own and seven other states to protest against any advance in rates. He said that he represented also the National Council of the Farmers' Grain Dealers' Association and other large interests. He said:

"In support of the plea that there is a crisis or emergency in the railroad industry, the carriers have given the impression that the increase in the cost of labor and supplies, without any general advance in freight rates being permitted during recent years, has caused a constantly declining net revenue. This proposition has been repeated in various forms and has had a profound effect. The exhibits which I offer in evidence, com-

piled from the sworn reports of these very carriers, demonstrate that, while their expenses have increased, the increase in their revenues has been greater, resulting in a constantly increasing net revenue.

"Last year their revenues above all operating expenses and above all taxes, were greater than for any other year in their history with only one exception, 1910, when the other advance rate case was pending. It is unfair to single out any one particular year and compare it to one other, but that is precisely what Mr. Willard did in his opening statement to you last November. The only comparisons of earnings or income which he made were those of 1913 compared to 1910. That method can be used to prove anything you desire. One can select a poor year and compare it with a good year, and prove one thing; or, reverse the process, and prove precisely the opposite to be true. Had Mr. Willard compared the net earnings of 1913 to the year on either side of 1910, whether 1909 or 1911, he would have proved exactly the opposite from what he claimed to be true. The only fair way to analyze tendencies is to consider a series of years. The average freight revenue per ton per mile is as high today as it was fifteen years ago; while the net earnings of American railroads are four hundred million dollars greater today than fifteen years ago.

"It has been stated that the alleged stagnation in the railway industry has served to paralyze other industries dependent largely on the railroads for support. Probably there is no industry more closely related to the railroad industry than that of iron and steel. The average daily production declined in the latter part of 1913. The same thing occurred during the latter part of 1910; and yet, since that date, the average daily production has exceeded anything reached prior to that time.

"The railroads have stated that they were unable to sell their securities. Their outstanding capital has increased more rapidly during recent years than ever before, and their dividends have increased even more rapidly than their capital stock. The outstanding capital stock of these eastern railroads in 1911 was 53 per cent. greater, and their dividends were 147 per cent. greater than in 1900. The actual amount of stock outstanding in the hands of the public is not represented by the figures; they include intercorporate payments; they are of significance as showing the relative increase in stocks and dividends.

"The carriers argue that, during recent years, they have been unable to secure the necessary funds for maintaining and improving their properties. Their allowances for maintenance during the past four years have been greater than for any other four year period in their history. And their allowances for maintenance last year were greater than for either one of the said four years. It is extremely difficult to account for some very large increases in maintenance in 1913. For instance, the Pennsylvania allowed for maintenance in 1912 a larger sum of money than ever before and, in 1913, they increased that sum by more than $22,000,000. Their statements show that only $2,400,000 of this $22,000,000 can be accounted for, because of the flood. The allowance for renewals and depreciation is practically a bookkeeping figure, and is left to the discretion of the company. The Pennsylvania increased its renewals and depreciation of freight cars last year, over 1912, 33 per cent.; and increased its renewals and depreciation of locomotives 110 per cent. per locomotive in 1913 over 1912. This one item meant an increase of more than $2,000,000. I am not able, and I do not claim, to say whether the allowance in 1913 was too large, or the allowance in 1912 was too small. But one of these two propositions must be true: either they were exaggerating their maintenance in 1913; or they were starving their maintenance in 1912, and prior years. In either event the resulting net income is not comparable, as representing the relative prosperity of the company. The carriers claim an increase in the cost of labor. But this only amounts to from 5 to 10 per cent. and does not begin to account for such increases as have been stated

"But entirely independent of all these exaggerated maintenance accounts; or, if the other be true, of the starvation maintenance allowances of former years; notwithstanding these facts, we find that a fair analysis shows the net revenues of these companies have been increasing instead of decreasing. And the additional fact stands out in bold prominence that, instead of being compelled to expend smaller sums for maintenance, we find they have been able to increase their maintenance allowances in excess of all former years."

THE RAILROAD'S STATEMENTS

The first testimony in behalf of the railroads was given by George Stuart Patterson, general counsel for the Pennsylvania Railroad. He presented a statement showing, for the Eastern roads as a whole, for seven months ending with January, a decrease in total freight revenues of $16,999,330; an increase in passenger revenues of $7,734,227; an increase of $2,269,574 in other sources of income, and a decrease in total operating revenues of $6,995,529, or 1.5 per cent. The total operating expenses showed an increase of $39,210,233, or 6.3 per cent. Mr. Patterson said further that the figures for February and March so far compiled show that these two months would show even greater increases in operating expenses and a further decrease in operating income.

A plea that the commission close its hearings at once and decide the question of a 5 per cent. advance at the earliest practicable date was made by George F. Brownell, vice-president of the Erie. Mr. Brownell declared the business situation confronting the railways to be a grave one. Every member of the commission was on the bench when Mr. Brownell made his request. Mr. Brownell said that the case was really submitted to the commission in May, 1913, when the carriers were denied a reopening of the old advance rate case. The matter dragged along until the railroads were compelled to prepare and formally file with the commission new tariffs. For several months past the carriers have been ready and desirous to proceed with their main case and to place their executives on the stand.

On Tuesday, the statement of earnings and expenses for the past seven months was amplified by the presentation of figures for individual roads, the Pennsylvania, the New York Central, the Baltimore & Ohio and others. On the three roads named, taken together, the decrease in net earnings, as compared with the preceding year, was 24.8 per cent. Similar exhibits were presented for the principal roads in Central Freight Association territory.

The principal testimony on Wednesday, in addition to that concerning earnings, was given by Mr. Willard, president of the Baltimore & Ohio. He gave a condensed history of the earnings and the important expenditures on capital account of his company for the past four years. Since the floods in Ohio last year, expenditures have been cut as low as possible consistent with safety.

To determine as near as possible the effect of changes in rates, all way bills of freight for the month of October, 1912, had been rewritten and the prices extended in accordance with the classification and rates which had been in effect in 1910; and this showed increases aggregating $20,000, and decreases aggregating $92,000, a net decrease of $72,000 in the freight income for a month. This investigation cost $5,000.

Questioned by the counsel of the Baltimore & Ohio, Mr. Willard showed the incomplete and misleading character of statements which had been made by Mr. Thorne.

Evidence of the impending crisis in railroad affairs, said Mr. Willard, may be found on every hand. If carriers cannot earn enough to pay a reasonable interest on the new capital needed, and thus the incentive to raise new capital is destroyed, that is a crisis for the carrier. If additional facilities needed by the people who depend on the Baltimore & Ohio cannot be furnished, that is a crisis for those people. If because of their inability to pay—not because the service is not needed—the road cannot employ men—that is a crisis for the workingmen. Three years

ago, the application for an increase in rates was based on a tendency; today it is not a matter of tendency, but one of fact.

Mr. Willard was questioned concerning the relations of his road to the Consolidation Coal Company, which had built the Sandy Valley & Elkhorn railroad in Kentucky, 36 miles long. The B. & O. had sold out its interest in the Sandy Valley before Mr. Willard became president. Questions were asked about money lost by the Baltimore & Ohio on its "outside operations." This loss was chiefly due to the cost of lighterage in New York harbor which averages six to seven cents per 100 lb. of freight, while the allowance out of the through rate, which is made to cover the lighterage, is the same as it was 20 years ago, three or four cents.

F. A. Delano, president of the Chicago, Indianapolis & Louisville, presented a statement describing the conditions of railroad credit, using for examples roads in Central Freight Association territory. He criticized statements which had been presented by Mr. Thorne.

On Wednesday Mr. Delano was questioned by Frank Lyon, attorney for the Pittsburgh Coal Company, who sought to bring out that a group of short coal-carrying roads in central freight association territory were not in the same position as to a need of higher rates as the others. Mr. Delano replied that some roads in the territory could do without higher rates, but to others a 5 per cent. advance would be wholly inadequate. All these roads should be granted the increase, he thought, and shippers could take up specific adjustments with the commission.

Asked if a 5 per cent. advance in freight rates would enable the roads in central freight association territory to maintain their properties fully and obtain the new capital necessary to take care of the business?" He answered: "No, but it would be a material help. It would enable the Wabash to meet its fixed charges. The Wabash and, in fact, 50 per cent. of the mileage in that territory, needs not only enough to pay interest on their property value but also to have a fair margin above that. Five per cent. won't do that. If this advance is granted, I think these railroads will study the questions raised in this case, such as terminal expenses and allowances, unduly low commodity rates, etc."

A. H. Smith, president of the New York Central lines, gave a condensed history of New York Central operations. In September, 1913, the New York Central system had 171,000 men on the payrolls; in October, 169,000; in November, 164,000; in December, 153,000; in January, 145,000; and in February, 144,000. The difference between September and February was 27,580 men; between February, 1914, and February, 1913, it was 12,000. In February, 1913, the number was 156,000.

Between June 30, 1910, and same date in 1913, the Central lines spent $159,000,000 on additions and betterments, of which $16,000,000 was on Grand Central Terminal. The remainder was on yards, second tracking signals, etc. In the same time gross earnings increased $49,000,000, and net decreased $2,437,000. The recent reduction of forces is divided as follows: Transportation reduced 9 per cent.; maintenance of equipment forces, 5 per cent.; maintenance of way and construction forces, 40 per cent. Normally the system should spend about $40,000,000 a year just to take care of the growth of traffic.

"We have made an increase in our average trainload of 67 tons or 14 per cent. since 1910, but despite every effort we are earning about $9,000 less a day than in 1910, though we are doing so much more business. The full-crew law requires us to spend $600,000 to $700,000 a year for men who are absolutely useless to us. We have an increasing burden of taxes, about $600,000 more every year than the year before. Last year the Ohio floods cost the Big Four $5,000,000, and they are not out of the woods yet."

Cross-examined by Frank Lyon, Mr. Smith gave reasons for the large increase in maintenance of equipment in the fiscal year 1913, chief of which was the carrying over of such work from the previous year. Present day equipment requires a better class of machinists. Depreciation charges have also come in within the past year, an average charge on all equipment book value of 2 per cent. a year. Mr. Brandeis questioned whether this was sufficient, and witness said he was doubtful.

W. H. Williams, third vice-president of the Delaware & Hudson, gave elaborate statistics of financial history. He said: The railroads are now compelled to pay more for their capital than at any time within eleven years. The railroads are between upper and nether millstones. They are not only compelled to raise the net interest rate on their new offerings in order to withstand the higher rates offered by municipalities, but they must also contend in the investment market with the increasing amount of new standard public utility and industrial offerings.

Thus, on the one hand the railroads have to meet the competition of an increasing amount of securities of the very highest character as regards safety, i. e., municipal borrowings; on the other hand, they have to compete with the high rates of return offered by the so-called public utility and industrial securities.

Railroad securities have lost a great deal of the strength of their former position as the most popular class of investment securities, occupying a place between government obligations (selling at a very low income yield), and public utility or industrial securities (offering a high income yield, but considered less desirable for conservative investment). This has contributed to (a) the pronounced fall in the prices of outstanding standard railroad securities and (b) greater difficulty in procuring new railroad capital.

"The average amount annually expended by the railroads during the last six years for additions and betterments has been substantially $600,000,000, and to earn 4.10 per cent. on this amount would require additional receipts of $78,544,061. Notwithtsanding the large capital expenditures made by the railroads, the economies and the increased traffic resulting therefrom have not been sufficient to offset the increased cost of wages, materials, supplies and taxes. If the railroads are to secure sufficient funds their credit must be improved, and this can only be accomplished by a larger excess of current earnings over the current cost of operation and taxes."

J. T. Wallis, general superintendent of motive power of the Pennsylvania, testified concerning cost of motive power. The Pennsylvania is obliged now to pay far more for repairs, supplies and general maintenance of equipment than ever before.

The Pennsylvania system "paid out $72,971,585 for maintenance of equipment in 1913, as compared with $58,197,036 in 1910—an increase of 25.39 per cent."

It is expected that the commission will, as far as possible, set aside all other business until a decision has been reached on the 5 per cent. advance case.

Railroad Extension in Tripoli.—The Italian State Railways on May 1, 1913, took over from the military authorities the operation of about 62 miles of railway about Tripoli. Since that time the number of passengers carried monthly has averaged about 18,000, 15,000 of these being Arabs. The freight business in like fashion has been beyond expectations. The directors have, therefore, decided to push the system into the more fertile sections of the mountain range which crosses the Tunis boundary 100 miles from the coast and extends in a northeasterly direction to Homs, a small town on the coast east of Tripoli. The Tripoli-Zanzur line, a branch of the main line to Azizia, will be extended along the coast towards Tunis for a distance of 50 miles. The line from Tripoli towards Azizia has already been built to a point 15 miles beyond the latter place; it is hoped that by July 1 it will have reached Garrian, 74 miles south of Tripoli, in the center of a large olive and fig district on the caravan route to Fezzan, which has recently been occupied by the Italians. The short 8-mile Tripoli-Tagiura line will be extended across a broad arable plain to the mountain district of Kusabat, 45 miles to the southeast, and the center of a large olive and barley district. There is also to be a line from Benghazi, the capital of Cirenaica, towards the naval base of Tobruk through a hilly grazing country, including sections adapted for barley and wheat.

General News Department

The United States Civil Service Commission will hold examinations May 6 for the position of junior civil engineer under the Interstate Commerce Commission; salary, $1,200 to $1,500.

A fire in the freight sheds of the Atlantic Coast Line on the company's new dock at Savannah, Ga., March 25, destroyed two large sheds and a considerable quantity of freight; total estimated loss, $125,000. Twenty-six empty freight cars were also burned up.

A press despatch from Melun, France, says that the conductor and engineman of the train responsible for the collision at that place November 4, have been tried in court and sentenced to imprisonment; the engineman for four months and the conductor for one month.

The safety committee of the Grand Trunk reports that from September, 1913, to February, 1914, inclusive, there was a decrease of 46 per cent. in the number of employees killed and a decrease of 16 per cent. in the number injured, as compared with the corresponding months of 1912 and 1913.

The express car in train No. 2 of the Seaboard Air Line was robbed near Columbia, S. C., on the night of March 28. The robber, who was alone, intimidated the express messenger with a pistol; and after taking one package, succeeded in jumping off the train, when it slackened speed; and he escaped.

G. W. W. Hanger, assistant commissioner of labor, arrived in Chicago on Monday for the purpose of mediation in connection with a wage controversy between the New York Central lines west and the Order of Railroad Telegraphers which recently voted to strike on those lines unless the demands were granted.

During five days following the storm of March 1, the Delaware, Lackawanna & Western sent all of its messages between Hoboken and Scranton by wireless telegraph; and during the ten days following the storm, 1,125 messages were sent by wireless. On March 6 the number transmitted between 9 a. m. and 6 p. m. was 120. Many of these messages contained 50 words or more.

The locomotive and baggage car of the Chicago, Milwaukee & St. Paul's "Olympian" train were derailed just outside the Chicago terminal on March 21 without serious injury to any one on the train. Officers of the road say the bolts had been removed from the rails and that evidence has been found of several recent attempts to wreck this train.

Officers and receivers of the Wabash have stated to the Commercial Club of Moberly, Mo., that the company has no intention of removing its shops from Moberly to Decatur, as was reported after the recent destruction of a large part of the Moberly shops by fire. The contract held by the city with the company is recognized as valid and binding, and no workmen will be removed permanently from Moberly to Decatur.

The strike of yard trainmen on the Monongahela division of the Pennsylvania, though not approved by the officers of the brotherhood, proved a stubborn one, about 600 men being reported on strike at the end of last week. The company gathered from other divisions about 200 trainmen to take the places of the strikers. The factories along this division dependent on transportation suffered a good deal of inconvenience from the congestion of traffic.

The Committee on Railway Mail Pay, representing 264 railroads handling mails on 218,000 miles of line, has issued another pamphlet setting forth in much detail the facts concerning the crude and unjust methods pursued by the postoffice department. The railroads claim that data compiled by the postoffice department, itself, properly interpreted, shows the railways to be underpaid by $29,000,000 annually for carrying the mails. It is pointed out that whereas postoffice revenues increased over $63,000,000 from 1907 to 1912, the railway mail pay in that time actually decreased over $300,000—before the parcel post was established. The pamphlet also directs attention to the fact that the postoffice department estimates a further increased annual revenue of about $60,000,000 on account of the parcel post; yet no practical action has been taken adequately to compensate the railroads for carrying the increased burden.

Retrenchment

Since December 1 last, the Pennsylvania Railroad has dismissed or suspended 15,000 employees because of the necessity to reduce expenses on account of the falling off in receipts; and of the 125,000 persons still kept at work, it is said that nearly one-third have been placed on part time. At Altoona, about 1,250 shopmen were laid off. In the general offices at Philadelphia, 200 clerks were laid off last week. Current reports indicate that further suspensions will be made. President Rea issued a statement in which he said that reductions in the forces had been delayed as long as possible. Many other roads began to reduce in the middle of 1913, but the Pennsylvania continued its men on the payrolls until the reduction in revenues became so serious that retrenchment was imperative. In the four months ending with February the decrease in net operating income was $6,652,671. A number of passenger trains were taken off several weeks ago; many others recently; and on April 1 the total number thus discontinued was 118; an aggregate reduction in train mileage of 170,645 miles monthly. On the Pennsylvania lines west of Pittsburgh, the mileage of the trains taken off since January 1 is about the same as that reported by the eastern lines. East of Pittsburgh and Erie, the most important trains taken off are the following:

Five between New York and Washington; four between Philadelphia and New York; ten on the Philadelphia division; two between Pittsburgh and Buffalo; one between Altoona and Philadelphia; eight on Maryland division; eleven on Trenton division, one on Middle division; two on Pittsburgh division; nine on Conemaugh division; three on Erie division and Northern Central; six on Baltimore division.

On the New York Central lines both east and west of Buffalo the dismissals or suspensions since December 1 last number about 25,000, two-fifths of which number represents the lines west of Buffalo.

Other roads have laid off large numbers of men, but reports are not so definite. The Erie has laid off 6,000 men since December. The Erie's shops are running on half time.

An officer of the New York Central said that the reduction in forces on that road had been gradual, but that few men had been dropped since January 1. "The present working force of the New York Central," he said, "numbers about 145,000 men. But if we were carrying an amount of business equal to that of last year we should need 15,000 more, and if there had been a normal growth, say of 4 to 6 per cent., we should need 25,000 more men than we now have on our payrolls."

Bureau of Information of the Eastern Railways

The establishment of this bureau was briefly noticed in the last issue of the *Railway Age Gazette*. The business of the bureau will be to collect, tabulate and keep up to date rates of pay, rules of service and working conditions affecting railroad employees, throughout the country, in such classes of service as may be hereafter decided upon. The temporary work of this kind which was carried out under the direction of the conference committee of managers, in connection with the arbitrations of wages in 1912 and 1913, had to do only with those classes of employees affected by the arbitration; but the present plan contemplates a broader field. Moreover it will be the duty of the bureau to gather information on this subject, which may be of value, not only from the roads which are parties to the agreement, but also from other roads, where practicable, anywhere in the United States.

The secretary of the bureau, John G. Walber, late of the Baltimore & Ohio, took a prominent part in the gathering of sta-

tistics in connection with the arbitrations referred to, and a good part of the material for his records is already in hand. The secretary will be under the orders of an executive committee of six general managers, to be appointed by the presidents of the roads. The roads interested are substantially the same as those which were parties to the arbitrations—those occupying the territory between the Atlantic ocean and Chicago and north of the Norfolk & Western Railway and the Ohio river. No participant in this agreement commits itself to any joint procedure concerning wages; which, interpreted, means that the bureau is simply an establishment for the gathering of facts and is not an instrumentality for carrying on any controversy with employees. Indeed, this move on the part of the railroads should be called a measure of peace, not war; for a complete knowledge of the facts of the complicated situations in regard to wages and working conditions which exist on most roads will, in any case of dispute or disagreement, be a marked advantage, not only to the employers, but to the employees.

Mr. Walber's office is in the Grand Central Terminal, Forty-fifth street, New York.

Railway Storekeepers' Association

The Railway Storekeepers' Association will hold its eleventh annual convention at the Hotel Raleigh, Washington, D. C., on May 18, 19 and 20. Besides the reports of the standing committees of the association there will be papers on: Stores Department Expenses; How to Obtain the Greatest Efficiency from Employees in the Stores Department; Handling of Stationery, and Classification of Electric Railway Materials.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 5-8, Hotel Pontchartrain, Detroit, Mich.

American Association of Demurrage Officers.—A. G. Thomason, Boston, Mass. Convention, April 21, St. Louis.

American Association of General Passenger and Ticket Agents.—W. C. Hope, 143 Liberty St., New York.

American Association of Freight Agents.—R. O. Wells, I. C. R. R., East St. Louis, Ill. Next convention, April 21, Rice Hotel, Houston, Tex.

American Association of Railroad Superintendents.—E. H. Harman, St. Louis, Mo.; 3d Thursday and Friday in May.

American Electric Railway Association.—E. B. Burritt, 29 W. 39th St., New York.

American Electric Railway Manufacturers' Assoc.—H. G. McConnaughy, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.

American Railway Association.—W. F. Allen, 75 Church St., New York.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

American Railway Engineering Association.—E. H. Fritch, 900 S. Michigan, Ave., Chicago.

American Railway Master Mechanics' Association.—J. W. Taylor, Karpen Building, Chicago. June 15-17, Atlantic City, N. J.

American Railway Tool Foremen's Association.—A. R. Davis, Central of Georgia, Macon, Ga. Next convention, July 20-22, Hotel Sherman, Chicago.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa. Next annual meeting, June 30 to July 4, Hotel Traymore, Atlantic City, N. J.

American Society of Civil Engineers.—Chas. W. Hunt, 220 West 57th St., New York; 1st and 3d Wed., except June, July and August, New York. Annual convention, June 2-5, Baltimore, Md.

American Society of Engineering Contractors.—J. R. Wemlinger, 11 Broadway, New York; 2d Thursday of each month, at 2 P. M., 11 Broadway, New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York. June 16-19, St. Paul-Minneapolis, Minn.

American Wood Preservers' Association.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

Association of American Railway Accounting Officers.—C. G. Phillips, Highland Park, Ill. Annual meeting, June 24, Minneapolis, Minn.

Association of Railway Claim Agents.—C. W. Egan, B. & O., Baltimore, Md. Next convention, May, St. Paul, Minn.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago. Semi-annual meeting, June 12, Hotel Denis, Atlantic City, N. J. Annual convention, October 19-23, Chicago.

Association of Railway Telegraph Superintendents.—P. W. Drew, 112 West Adams St., Chicago. Next convention, May 19-22, New Orleans, La.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York. Annual meeting, Hotel Chalfont, Atlantic City, N. J., June 18-19.

Association of Water Line Accounting Officers.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y.

Bridge and Building Supply Men's Association.—L. D. Mitchell, Detroit Graphite Co., Detroit, Mich. Meeting with American Railway Bridge and Building Association.

Canadian Railway Club.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal.

Canadian Society of Civil Engineers.—Clement H. McLeod, 176 Mansfield St., Montreal, Que.; 1st Thursday, October, November, December, February, March and April, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago; 2d Monday in month, except July and August, Lytton Bldg., Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York; 2d Fri. in Jan., May, Sept. and Nov. and 2d Thurs. in March, Hotel Statler, Buffalo, N. Y.

Civil Engineers' Society of St. Paul.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.

Engineers' Society of Pennsylvania.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after second Saturday, Harrisburg, Pa.

Engineers' Society of Western Pennsylvania.—E. H. Hiles, Oliver building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

Freight Claim Association.—Warren P. Taylor, Richmond, Va. Next convention, May 13, Hotel Galvez, Galveston, Tex.

General Superintendents' Association of Chicago.—A. M. Hunter, 605 Grand Central Station, Chicago; Wed. preceding 3d Thurs., Transportation Bldg., Chicago.

International Railway Congress.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

International Railway Fuel Association.—C. G. Hall, 922 McCormick Bldg., Chicago. Annual convention, May 18-21, Chicago.

International Railway General Foremen's Association.—Wm. Hall, 829 West Broadway, Winona, Minn. Next convention, July 14-17, Hotel Sherman, Chicago.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, Lima, Ohio. Next convention, third Tuesday in August.

Maintenance of Way Master Painters' Association of the United States and Canada.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York. Next annual meeting, May 25-28, Hotel Walton, Philadelphia.

Master Car Builders' Association.—J. W. Taylor, Karpen building, Chicago. June 10-12, Atlantic City, N. J.

Master Car & Locomotive Painters' Assoc. of U. S. and Canada.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 8-11, Nashville, Tenn.

National Railway Appliances Association.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15 to 19, 1915, Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

New York Railroad Club.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

Peoria Association of Railroad Officers.—M. W. Rotchford, Union Station, Peoria, Ill.; 2d Thursday in month, Jefferson Hotel, Peoria.

Railroad Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York.

Railway Club of Pittsburgh.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

Railway Electrical Supply Manufacturers' Assoc.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

Railway Fire Protection Association.—C. B. Edwards, Mobile & Ohio, Mobile, Ala. Annual meeting, 1st Tuesday in October.

Railway Gardening Association.—J. S. Butterfield, Lee's Summit, Mo.

Railway Development Association.—W. Nicholson, Kansas City Southern, Kansas City, Mo.

Railway Signal Association.—C. C. Rosenberg, Bethlehem, Pa. New York, June 9. Annual meeting, Bluff Point, N. Y., September 22.

Railway Storekeepers' Association.—J. P. Murphy, Box C, Collinwood, Ohio. Next convention, May 18-20, Hotel Raleigh, Washington, D. C.

Railway Supply Manufacturers' Association.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with M. C. B. and M. M. Associations. Atlantic City, June 10 to 17.

Railway Telegraph & Telephone Appliance Association.—G. A. Nelson, 50 Church St., New York. Meetings with Assoc. of Ry. Teleg. Supts.

Richmond Railroad Club.—F. O. Robinson, C. & O., Richmond, Va.; 2d Monday in month, except June, July and August.

Roadmasters' and Maintenance of Way Association.—L. C. Ryan, C. & N. W., Sterling, Ill. Next convention, September 8-10, 1914, Chicago.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

Salt Lake City Transportation Club.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah; 1st Saturday of each month, Salt Lake City.

Signal Appliance Association.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

Society of Railway Financial Officers.—Carl Nyquist, La Salle St. Station, Chicago.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

Southern & Southwestern Railway Club.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., 10 a. m., Candler Bldg., Atlanta.

Toledo Transportation Club.—J. S. Marks, Agent, Interstate Despatch, Toledo, Ohio; 1st Saturday in month, Boody House, Toledo.

Track Supply Association.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

Traffic Club of Chicago.—W. H. Wharton, La Salle Hotel, Chicago.

Traffic Club of New York.—C. A. Swope, 291 Broadway, New York; last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Erie R. R., Pittsburgh, Pa.; meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

Traffic Club of St. Louis.—A. F. Versen, Mercantile Library building, St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

Train Despatchers' Association of America.—J. F. Mackie, 7122 Stewart Ave., Chicago. Next convention, June 16, Jacksonville, Fla.

Transportation Club of Buffalo.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

Transportation Club of Detroit.—W. R. Hurley, Supt.'s office, L. S. & M. S., Detroit, Mich.; meetings monthly, Normandie Hotel, Detroit.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, August, Chicago.

Utah Society of Engineers.—Fred D. Ulmer, Oregon Short Line, Salt Lake City, Utah; 3d Friday of each month, except July and August.

Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, 1112 Karpen building, Chicago; 3d Tuesday of each month, except June, July and August, Karpen building, Chicago.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago; regular meeting 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

Traffic News

The spring meeting of the National Industrial Traffic League will be held at the Hotel Statler, Cleveland, April 23 and 24.

Invitations have been issued by the Denver Chamber of Commerce to the commercial organizations of thirteen cities in seven western states, asking that representatives be sent to a freight rate conference to be held in Denver on April 7. The purpose of the meeting is to agitate for a general readjustment of freight rates throughout the entire Rocky mountain region.

Passenger fares for the round trip to the Panama-Pacific Exposition at San Francisco, and the Panama-California Exposition at San Diego in 1915, were decided upon at a meeting of the Transcontinental Passenger Association, held at San Francisco last week. The destinations named on the tickets will be Oakland, San Francisco, Los Angeles and San Diego. The rates are to be effective from March 1 to November 30, and tickets will have a return limit of three months. The round trip rates will be: from the Missouri river, $50; from St. Louis, $57.50, and from Chicago, $62.50.

New Cotton Warehouses at New Orleans

In an endeavor to strengthen New Orleans' position as a cotton exporting center, the state of Louisiana, through the Board of Commissioners of the port of New Orleans, is planning the construction in that city of a modern cotton terminal and warehouse plant. A bond issue of $3,000,000 has been floated at par; and a tract of about 70 acres, with a frontage of 3,000 ft. on the Mississippi river, has been obtained. Plans for the erection of the warehouses are now being prepared. It is proposed to put up six warehouses, each 600 ft. long and 100 ft. wide, eight stories high. These will give a storage capacity of 324,000 bales. In providing ample storage room at low rates the state will aid owners of cotton to sell at the best prices, and also to take advantage of low freight rates offered by tramp steamers. It is hoped that the business will warrant the use of cotton certificates, as grain certificates are used in northern ports. With the present facilities at New Orleans, cotton has to be carted through the city twice, in many cases, and it is hoped to reduce the total cost of storage and handling one-half.

Car Location

The accompanying table, which was taken from bulletin No. 16 of the American Railway Association, gives a summary of freight car location by groups on March 1, 1914.

Annual Dinner Traffic Club of Pittsburgh

The twelfth annual dinner of the Traffic Club of Pittsburgh was held on March 27, in Soldiers' Memorial Hall, Pittsburgh. President E. C. Sattley presided, and Dr. Francis Harvey Green, of the Westchester State Normal School, acted as toastmaster. The speakers were Daniel Willard, president of the Baltimore & Ohio, and John Barrett, director-general of the Pan-American Union. An abstract of Mr. Willard's address is given elsewhere in this issue. Mr. Barrett discussed "The Panama Canal and Pan-American Commerce—what they mean to the Traffic Interests of the United States." He said in part:

"At first the transcontinental systems or their sections between the Mississippi valley and the Pacific coast may suffer from the competition of the canal, especially in the bulky class of freight, but in the course of a few years what they will lose in this respect will be more than counter-balanced by their growth of business in the increased prosperity of both the Pacific coast and the western portion of the central west. In other words, in the course of five years the increased development of local business which will come indirectly from the opening of the canal will far more than make up for the loss of the heavy through business.

"The investigations which I have carried on both officially and personally as to what is being done by the great commercial interests of Europe and Asia convince me that unless the corresponding interests of the United States wake up and make extraordinary efforts along the same line the canal will prove a far greater advantage during the earlier years of its use to foreign lands than it will to the United States.

"I can tell you that there is not a great port or exporting or importing center of Europe, of Japan, of Australia, and of northern and western South America that is not today doing more to get ready for the Panama canal than our corresponding ports and centers of the United States with the possible exception of New Orleans and San Francisco."

Traffic Club of Chicago

The Traffic Club of Chicago, on March 31, elected the following officers: President, J. Charles Maddison, traffic manager, Montgomery Ward & Co.; first vice-president, C. A. Cairns, general passenger and ticket agent, Chicago & North Western; second vice-president, H. F. Prince, traffic manager, American Steel Foundries; third vice-president, Charles H Stevens, general agent, Chicago, Peoria & St. Louis; secretary, W. H. Wharton, commercial agent, Nashville, Chattanooga & St. Louis; treasurer, Charles B. Hopper, general freight agent, Goodrich Transit Company; directors for two years: F. W. Smith, member Uniform Classification Committee; Carl Howe, manager, New York Central Fast Freight Lines; A. G. Francis, railroad agent, Chicago Telephone Company; A. B. Schmidt, traffic manager, Sears, Roebuck & Co.

CAR LOCATION ON MARCH 1, 1914

	New England.	N.Y., N.J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., No. & So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn.	Mont., Wyo., Neb., Dakotas.	Kans., Colo., Okla., Mo., Ark.	Texas, La., New Mexico.	Oregon, Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Total Cars Owned	88,612	699,271	281,868	208,699	174,058	490,353	20,003	157,460	33,974	137,662	151,978	2,443,938
Home Cars on Home Roads	50,261	440,215	124,553	131,269	103,106	338,065	9,143	99,845	19,769	81,140	100,419	1,497,785
Home Cars on Foreign Roads	38,351	259,056	157,315	77,430	70,952	152,288	10,860	57,615	14,205	56,522	51,559	946,153
Foreign Cars on Home Roads	49,642	239,423	189,406	77,049	62,096	147,590	10,908	64,806	25,381	45,265	28,691	940,257
Total Cars on Line	99,903	679,638	313,959	208,318	165,202	485,655	20,051	164,651	45,150	126,405	129,110	2,438,042
Excess or Deficiency	11,291	*19,633	32,091	*381	*8,856	*4,698	48	7,191	11,176	*11,257	*22,868	*5,896
Surplus	725	32,639	21,996	15,491	8,339	14,618	3,148	14,364	5,065	27,355	15,740	159,480
Shortage	1,487	...	928	980	188	1,581	...	...	2	400	7	5,573
Shop Cars—												
Home Cars in Home Shops	5,681	53,974	21,493	14,257	12,182	33,304	1,117	9,999	2,968	6,974	8,060	170,009
Foreign Cars in Home Shops	1,266	6,721	7,338	1,870	1,442	4,283	612	6,061	1,136	2,309	315	33,353
Total Cars in Shops	6,947	60,695	28,831	16,127	13,624	37,587	1,729	16,060	4,104	9,283	8,375	203,362
Per Cent. to Total Cars Owned—												
Home Cars on Home Roads	56.72	62.95	44.19	62.90	59.24	68.94	45.71	63.41	58.19	58.94	66.07	61.29
Total Cars on Line	110.33	97.19	111.30	99.82	94.91	99.04	100.24	102.62	132.90	91.82	84.95	99.76
Home Cars in Home Shops	6.41	7.72	7.63	6.83	7.00	6.83	5.58	6.35	8.74	5.06	5.30	6.96
Foreign Cars in Home Shops	1.19	.96	2.60	.90	.83	.88	3.06	3.72	3.34	1.68	.21	1.36
Total Cars in Shops	7.60	8.68	10.23	7.73	7.83	7.71	8.64	10.07	12.08	6.74	5.51	8.32

*Denotes deficiency.

REVENUES AND EXPENSES OF RAILWAYS

SIX MONTHS ENDING DECEMBER, 1913

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total. inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	General.	Total.					
Alabama & Vicksburg	142	$630,635	$273,975	$974,046	$145,266	$197,997	$23,075	$334,053	$34,589	$734,982	$239,064	—$2,745	$54,342	$181,975	—$50,636
Alabama Great Southern	309	1,894,783	713,216	2,831,125	339,796	690,298	81,261	921,614	59,529	2,092,500	738,624	—2,334	96,201	640,089	—82,835
Ann Arbor	291	765,991	313,914	1,157,312	137,782	153,666	30,079	401,465	40,170	763,163	394,149	—233	81,600	312,315	26,278
Arizona & New Mexico	108	408,823	55,833	487,801	70,022	54,505	4,754	95,677	18,922	243,882	243,918	.....	15,383	228,535	—61,683
Arizona Eastern	366	1,066,179	237,489	1,374,214	158,034	198,229	12,277	383,959	64,687	811,183	563,025	—187	87,098	475,739	—159,888
Atchison, Topeka & Santa Fe	8,351	31,864,223	12,778,732	48,409,419	6,842,001	8,570,299	1,062,170	13,620,819	1,118,519	31,213,810	17,195,608	.....	2,355,536	14,840,072	—1,000,384
Atlanta & West Point	92	330,302	260,338	660,413	92,218	133,174	30,416	202,311	28,614	486,735	173,677	1,539	40,473	134,743	—10,764
Atlanta, Birmingham & Atlantic	645	1,303,057	381,192	1,831,984	297,685	290,208	83,890	691,157	66,915	1,429,858	402,126	.....	86,021	316,104	63,731
Atlantic & St. Lawrence	166	508,904	202,350	776,752	152,356	125,127	27,065	370,560	25,458	700,568	76,184	.....	60,942	15,242	6,421
Atlantic City	166	402,359	953,079	1,431,043	245,325	69,129	19,067	667,081	9,115	1,009,718	421,324	—21,337	54,000	345,987	48,806
Atlantic Coast Line	4,620	11,762,589	4,385,345	17,453,837	2,507,181	2,921,448	307,971	6,210,747	592,317	12,539,666	4,914,170	—3,260	792,000	4,118,910	—172,784
Baltimore & Ohio	4,456	40,779,858	8,909,331	52,653,964	6,855,634	8,813,734	1,176,393	20,063,104	1,158,316	38,067,182	14,586,781	—462,481	1,628,191	12,496,108	—1,690,252
Baltimore & Ohio Chicago Terminal	77	.....	4,508	910,404	118,862	134,103	4,239	404,948	30,980	693,134	217,270	5,028	104,543	117,754	8,196
Bangor & Aroostook	630	1,305,476	389,015	1,782,317	236,414	267,008	15,471	587,903	61,691	1,168,489	613,827	—905	59,620	553,301	63,538
Belt Railway Co. of Chicago	...	.....	.....	1,504,318	170,341	157,775	3,338	611,837	38,914	982,207	522,110	.....	58,207	463,903	—105,656
Bessemer & Lake Erie	203	4,967,643	246,138	5,287,588	466,110	1,154,838	66,759	1,259,692	89,184	3,036,585	2,251,003	.....	228,000	2,023,003	—361,651
Bingham & Garfield	26	851,254	26,598	882,053	57,726	117,965	5,640	131,454	14,490	327,276	554,777	.....	17,922	536,855	247,385
Birmingham Southern	43	382,078	6,162	635,508	98,115	75,466	3,079	211,859	27,942	416,463	219,045	.....	14,874	204,170	—2,127
Boston & Maine	2,251	14,467,622	9,024,457	25,420,147	3,811,043	3,892,667	218,055	11,224,023	636,459	19,782,249	5,637,898	109,105	1,031,869	4,715,133	841,831
Buffalo & Susquehanna	252	853,501	52,648	929,678	179,501	179,926	9,861	318,161	42,146	729,597	200,081	.....	4,120	195,960	—38,477
Buffalo, Rochester & Pittsburgh	572	5,228,054	668,408	6,099,752	807,675	1,167,387	78,706	2,060,323	121,665	4,235,758	1,863,994	—527	108,000	1,755,466	121,710
Butte, Anaconda & Pacific	90	600,088	86,099	749,468	101,904	124,875	4,091	275,834	19,975	526,663	222,804	.....	15,755	207,049	108,562
Canadian Pacific (Lines in Maine)	233	371,701	165,724	589,637	221,174	95,656	40,008	273,217	31,580	661,638	—72,001	.....	66,000	—138,001	—56,171
Carolina, Clinchfield & Ohio	248	1,250,096	117,252	1,394,500	96,331	161,777	41,471	247,301	52,720	599,602	794,898	.....	55,500	739,398	53,821
Central New England	293	1,609,884	249,491	1,952,142	274,043	222,206	8,213	603,005	26,613	1,134,082	818,059	—808	63,000	754,250	—164,133
Central of Georgia	1,924	4,884,127	2,087.304	7,597,291	982,718	1,526,537	209,699	2,476,840	239,578	5,435,373	2,161,918	39,534	314,943	1,886.508	—40,341
Central of New Jersey	676	10,644,983	3,125,769	14,279,457	1,616,020	2,290,163	197,837	4,375,603	266,571	8,746,196	5,533,261	92,240	652,275	4,973,225	—1,293,761
Central Vermont	411	1,388,930	610,881	2,155,968	386,151	409,926	56,056	1,055,367	49,788	1,957,290	198,678	2,801	93,000	108,479	233,231
Charleston & Western Carolina	340	809,422	215,095	1,071,571	194,534	169,530	20,506	392,643	28,758	805,972	265,598	.....	30,000	235,598	41,535
Chesapeake & Ohio	2,341	14,391,130	3,344,091	18,612,133	2,090,916	3,778,874	339,561	5,913,136	452,341	12,574,829	6,037,304	6,892	663,110	5,381,086	61,381
Chicago & Alton	1,032	5,027,589	2,312,237	7,917,804	990,156	1,906,975	264,021	2,989,211	217,868	6,368,232	1,549,572	—17,756	242,300	1,289,515	—400,644
Chicago & Eastern Illinois	1,283	6,186,987	1,591,536	8,450,841	1,484,325	2,130,722	144,074	3,066,415	235,743	7,061,281	1,389,559	—17,357	290,500	1,081,701	—820,530
Chicago & Erie	269	2,154,877	386,046	2,800,269	604,627	680,093	128,821	1,444,448	77,558	2,935,549	—135,280	—25,952	89,916	—251,148	—315,020
Chicago & North Western	8,046	29,093,583	11,823,409	45,029,937	6,540,863	6,339,843	697,449	16,409,270	865,617	30,853,044	14,176,892	4,075	1,986,000	12,194,968	603.768
Chicago, Burlington & Quincy	9,128	34,452,921	12,255,825	51,064,083	5,865,955	8,293,035	836,461	15,719,605	1,141,567	31,856,626	19,207,457	—81,622	1,819,994	17,305,841	—1,011,726
Chicago Great Western	1,496	5,180,045	1,789,275	7,533,583	1,207,185	1,156,152	285,347	2,723,977	215,939	5,588,603	1,944,980	—2,451	232,238	1,710,290	—254,755
Chicago, Indiana & Southern	358	2,015,963	176,436	2,265.023	357,493	720,617	46,727	791,516	62,194	1,978,548	286,474	2,677	94,466	194,686	—272,088
Chicago, Indianapolis & Louisville	616	2,450,797	920,049	3,684,394	538,704	535,204	120,161	1,330,291	95,081	2,619,443	1,064,950	.....	154,341	910,609	—121,299
Chicago Junction	11	.....	.....	1,080,423	119,418	100,406	7,358	559,233	27,223	813,641	266,781	.....	16,266	250,515	—77,983
Chicago, Milwaukee & St. Paul	9,690	34,919,278	10,538,306	49,347,705	6,262,372	7,095,570	974,626	17,176,820	860,935	32,370,325	16,977,380	163,957	2,043,244	15,098,093	—2,392,130
Chicago, Peoria & St. Louis	255	634,744	185,150	870,803	84,788	208,755	41,697	415,138	30,802	881,181	—10,377	.....	28,800	—39,177	—85,293
Chicago, Rock Island & Gulf	476	1,070,332	354,827	1,537,847	178,075	217,656	58,788	591,260	47,083	1,092,864	444,982	—6,052	62,167	376,762	302,211
Chicago, Rock Island & Pacific	7,604	22,390,921	10,151,317	34,705,934	4,546,940	4,941,750	940,842	13,800,013	935,323	25,164,870	9,541,064	—94,692	1,749,844	7,696,527	—1,191,356
Chicago, St. Paul, Minneapolis & Omaha	1,746	6,051,986	2,979,460	9,650,789	1,439,122	1,137,223	176,411	3,579,951	211,067	6,543,777	3,107,012	13,717	471,136	2,649,593	79,048
Chicago, Terre Haute & Southeastern	361	1,006,935	110,488	1,144,902	187,109	332,627	23,018	362,530	53,459	958,744	186,157	—2,289	69,000	114,868	—108,905
Cincinnati, Hamilton & Dayton	1,014	3,915,056	925,395	5,418,597	860,511	916,214	134,715	2,533,135	120,870	4,565 447	853,149	.....	208,111	645,038	—740,809
Cincinnati, New Orleans & Texas Pacific	337	4,154,479	1,043,184	5,461,553	544,997	1,389,636	150,633	1,560,469	118,755	3,764,491	1,697,061	—3,372	182,000	1,511,689	—111,266
Cincinnati Northern	244	654,067	132,465	821,677	180,315	229,365	17,189	340,529	21,434	788,833	32,844	.....	34,059	—1,214	—185,574
Cleveland, Cincinnati, Chic. & St. Louis	2,013	11,751,565	4,562,466	17,876,421	2,431,300	4,473,057	468,943	7,571,696	372,122	15,317,120	2,559,300	—1,675	665,162	1,892,462	—2,925,562
Colorado & Southern	1,129	3,036,463	890,082	4,181,117	602,202	871,399	67,233	1,394,035	132,127	3,066,997	1,114,119	—5,900	199,050	909,169	—355,757
Colorado Midland	337	755,680	163,647	1,000,483	193,870	223,771	50,591	433,041	34,285	935,561	64,921	—2,489	50,000	12,432	—163,535
Cumberland Valley	162	1,340,318	391,229	1,809,944	427,889	199,247	32,530	595,344	52,985	1,307,997	501,946	1,180	37,333	465,792	—95,492
Delaware & Hudson	853	10,089,438	1,885,301	12,404,740	922,184	1,864,381	169,566	4,422,088	397,353	7,775,574	4,629,166	—12,341	321,603	4,295,221	—386,382
Delaware, Lackawanna & Western	958	15,443,618	4,694,088	21,512,402	2,690,323	3,099,841	449,898	6,380,162	406,460	13,026,685	8,485,717	279,034	990,000	7,774,752	—326,741
Denver & Rio Grande	2,585	9,468,391	3,130,363	13,153,909	2,043,862	2,301,214	261,181	3,988,015	317,100	8,911,373	4,242,535	12,986	563,600	3,671,922	—431,098
Denver & Salt Lake	221	391,985	233,183	660,700	109,326	92,814	14,082	197,843	26,724	440,792	219,907	.....	24,000	195,907	—211,452
Detroit & Mackinac	411	385,926	193,049	620,522	74,742	98,420	14,451	221,259	15,964	424,837	195,684	783	51,778	144,688	—4,481
Detroit & Toledo Shore	78	801,118	.....	804,967	82,168	46,964	10,165	223,467	16,120	378,886	426,080	.....	35,400	390,680	91,146
Detroit, Grand Haven & Milwaukee	190	786,967	379,353	1,369,137	173,021	167,442	42,963	656,017	33,427	1,072,873	296,263	499	21,600	275,163	158,228
Detroit, Toledo & Ironton	441	683,199	80,408	837,597	216,679	288,893	15,931	469,252	33,009	1,023,766	—181,169	.....	34,200	—220,369	—361,382
Duluth & Iron Range	272	4,253,281	157,492	4,738,904	553,476	444,484	6,855	1,025,291	106,968	2,137,076	2,601,828	20,468	256,407	2,365,889	133,298

REVENUES AND EXPENSES OF RAILWAYS

SIX MONTHS ENDING DECEMBER, 1913—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total. inc. misc.	Maintenance Way and structures.	Maintenance Of equipment.	Traffic.	Transportation.	General.	Total.					
Duluth, Missabe & Northern	357	$5,276,225	$205,537	$5,532,770	$569,254	$548,322	$13,940	$1,015,778	$97,937	$2,245,234	$3,287,536	$20,754	$315,602	$2,992,687	—$31,913
Duluth, South Shore & Atlantic	627	1,061,342	645,676	1,834,078	453,525	214,403	52,873	660,536	69,448	1,450,787	383,291	8,044	120,034	271,301	—1,621
Duluth, Winnipeg & Pacific	181	763,855	150,632	932,709	179,740	111,074	11,325	336,307	35,034	673,481	259,227	.....	46,659	212,568	117,145
El Paso & Southwestern	982	3,571,450	606,171	4,366,080	767,687	626,862	92,342	1,239,481	160,046	2,886,419	1,479,660	—12,866	257,959	1,208,834	—523,273
Elgin, Joliet & Eastern	802	5,886,544	24	6,295,131	998,709	1,279,195	36,311	1,813,868	138,181	4,266,266	2,028,864	.....	193,509	1,835,355	—1,112,009
Erie	1,987	20,364,542	5,320,465	27,885,093	3,691,628	5,145,523	657,490	9,468,417	642,761	19,605,820	8,279,272	—110,190	932,050	7,237,031	—1,637,647
Florence & Cripple Creek	86	478,117	127,942	618,207	93,795	58,249	13,177	171,337	25,181	361,741	256,466	.....	19,349	237,116	—47,326
Florida East Coast	675	1,070,792	722,296	2,041,681	462,662	381,915	41,980	805,896	69,473	1,761,928	279,752	1,695	120,000	161,448	—85,264
Fort Worth & Denver City	454	1,657,949	857,733	2,642,601	348,704	431,020	44,860	1,003,259	93,794	1,921,639	720,961	—3,471	102,652	614,837	—482,718
Galveston, Harrisburg & San Antonio	1,338	4,185,186	1,614,124	6,122,542	686,984	1,168,772	209,317	2,460,458	204,634	4,730,167	1,392,375	—15,713	348,104	1,028,556	—518,865
Georgia R. R. Lessee Organization	307	1,138,560	505,894	1,759,640	187,390	289,208	70,449	784,231	53,353	1,384,634	375,006	.....	17,330	357,675	207,923
Georgia Southern & Florida	39	748,328	445,001	1,349,173	167,077	264,594	49,578	534,729	60,783	1,076,766	272,406	—487	69,228	202,690	15,377
Grand Rapids & Indiana	575	1,638,743	1,137,302	3,000,710	404,950	445,985	79,578	1,247,466	94,825	2,272,806	727,903	—1,880	144,384	581,639	—108,594
Grand Trunk Western	347	2,245,102	1,251,782	3,710,214	462,351	653,105	142,280	1,691,940	104,345	3,054,024	656,189	—10,520	189,000	456,669	—456,519
Great Northern	7,759	33,315,973	8,903,701	44,991,521	6,173,729	5,084,894	680,056	11,470,759	708,161	24,117,601	20,873,920	121,333	2,352,892	18,642,361	—1,083,094
Gulf & Ship Island	307	785,442	220,267	1,074,113	127,565	197,187	17,496	282,752	49,690	674,691	399,421	.....	42,587	356,834	52,680
Gulf, Colorado & Santa Fe	1,595	4,924,051	1,692,719	7,032,669	1,142,412	1,077,845	158,787	2,619,236	191,580	5,189,861	1,842,808	.....	339,218	1,503,590	—771,656
Hocking Valley	351	3,471,737	516,872	4,282,599	443,376	795,437	58,175	1,362,291	90,336	2,749,618	1,532,981	.....	246,000	1,286,981	97,008
Houston & Texas Central	789	2,362,790	1,074,648	3,679,057	488,973	500,292	90,893	1,612,332	107,348	2,799,840	879,217	—505	183,229	695,482	241,288
Houston East & West Texas	190	466,993	219,622	729,381	104,865	78,091	11,888	303,768	24,903	523,517	205,863	.....	32,124	173,739	29,693
Illinois Central	4,762	22,848,932	7,333,485	34,408,033	5,022,651	7,567,909	644,828	12,283,007	791,687	26,310,083	8,097,949	—13,613	1,598,051	6,486,284	486,032
Indiana Harbor Belt	104	.....	.....	1,649,769	248,605	201,554	17,276	779,324	46,499	1,293,260	356,508	18,856	39,541	335,523	—141,245
International & Great Northern	1,159	3,972,821	1,271,514	5,598,507	781,014	622,577	158,460	2,258,873	198,449	4,019,375	1,579,132	—9,719	149,841	1,419,571	—465,926
Kanawha & Michigan	176	1,504,286	207,523	1,751,679	250,687	389,520	17,111	518,008	42,093	1,217,421	534,258	—20	59,965	474,272	—116,145
Kansas City Southern	827	3,975,044	915,377	5,443,754	524,443	663,410	162,182	1,785,015	210,936	3,345,988	2,097,765	.....	246,373	1,851,391	—100,376
Lake Erie & Western	905	2,393,211	483,595	3,058,386	509,518	627,915	96,420	1,194,642	73,371	2,501,868	556,518	.....	133,640	422,878	—356,854
Lake Shore & Michigan Southern	1,859	18,513,795	7,103,618	28,907,566	3,988,004	6,915,399	550,787	10,104,791	574,936	22,133,918	6,773,647	—51,764	1,232,212	5,593,200	—4,593,871
Lehigh & Hudson River	96	843,214	28,103	921,840	183,127	147,281	8,767	345,098	26,386	710,661	211,179	.....	24,000	187,179	—94,868
Lehigh & New England	285	928,162	7,318	964,924	132,984	127,755	12,892	249,633	23,272	546,538	418,385	.....	19,071	399,314	—35,721
Lehigh Valley	1,438	17,745,187	2,739,284	21,236,622	2,478,264	3,745,402	518,277	7,218,415	426,627	14,386,987	6,849,634	—133,704	748,000	5,967,930	—1,240,137
Long Island	398	1,716,664	4,377,062	6,831,443	820,247	740,105	106,027	2,830,511	166,158	4,663,050	2,168,393	—18,520	389,415	1,760,456	—388,680
Louisiana & Arkansas	270	677,425	146,827	852,982	156,335	127,349	15,202	219,570	31,551	550,008	302,974	.....	27,598	275,376	13,414
Louisiana Railway & Navigation Co	350	811,294	157,421	1,030,945	200,605	121,820	38,223	411,021	37,754	809,425	221,519	.....	36,500	185,019	—79,859
Louisiana Western	207	705,087	373,128	1,135,076	123,681	240,695	44,460	373,087	39,115	821,040	314,035	—1,005	65,273	247,755	—113,610
Louisville & Nashville	4,923	22,651,235	7,008,562	31,590,409	4,874,387	6,243,031	647,820	10,568,967	633,781	22,967,988	8,622,421	1,772	946,479	7,677,714	1,426
Louisville, Henderson & St. Louis	199	444,271	219,073	705,079	140,124	89,483	27,412	234,807	19,574	511,400	193,678	1,503	21,600	173,581	85,986
Maine Central	1,206	3,625,816	2,032,012	6,045,193	986,834	929,442	76,764	2,282,826	163,949	4,439,816	1,605,376	—15,449	285,261	1,304,665	—231,341
Michigan Central	1,799	11,331,152	5,170,625	18,306,749	2,737,357	3,315,873	396,899	7,614,835	319,044	14,384,010	3,922,738	—6,003	696,813	3,219,922	—1,833,180
Midland Valley	373	603,343	255,352	901,047	191,643	161,809	15,556	309,169	38,707	716,887	184,160	386	39,429	145,117	—15,103
Minneapolis & St. Louis	1,585	3,655,847	1,072,596	5,024,969	717,583	688,472	104,863	1,840,247	118,938	3,470,106	1,554,863	—271	204,685	1,349,906	—152,292
Minneapolis, St. Paul & Sault Ste. Marie	3,977	11,367,217	3,879,679	16,159,529	2,032,008	2,420,626	331,811	4,985,215	319,088	10,088,750	6,070,778	102,219	662,314	5,511,383	—1,741,193
Missouri & North Arkansas	365	417,502	230,674	687,066	161,333	114,320	21,913	254,855	32,910	585,334	101,732	.....	33,000	68,732	65,638
Missouri, Kansas & Texas	3,816	11,002,565	5,142,809	17,276,143	2,720,694	2,172,030	374,094	6,407,260	591,445	12,265,525	5,010,618	—77,219	781,487	4,151,911	—1,462,017
Missouri, Oklahoma & Gulf	332	474,589	136,234	636,264	111,216	98,722	33,954	286,057	39,859	569,811	66,453	2,784	36,000	33,238	—55,202
Missouri Pacific	3,919	10,821,178	2,656,851	14,656,328	2,432,366	2,762,606	369,222	5,939,327	425,106	11,928,630	2,727,698	—21,927	567,870	2,138,531	—538,378
Mobile & Ohio	1,122	5,456,687	822,076	6,672,100	771,544	1,296,350	241,302	2,481,126	195,840	4,986,164	1,685,936	8,129	209,002	1,468,804	—43,398
Monongahela	66	760,837	17,439	790,454	106,007	47,337	2,512	158,211	12,868	326,938	463,516	.....	14,100	449,416	—29,048
Monongahela Connecting	6	.....	.....	514,753	56,695	100,790	1,800	239,200	15,078	413,564	101,188	.....	17,786	83,401	—70,485
Morgan's La. & Texas R. R. & S. S. Co	404	1,735,749	596,066	2,514,725	272,956	402,919	73,519	1,006,112	74,844	1,830,351	684,373	—9,217	146,842	528,313	—84,701
Nashville, Chattanooga & St. Louis	1,231	4,413,744	1,664,697	6,524,041	1,034,113	1,227,610	253,999	2,442,275	180,048	5,138,048	1,385,993	—7,035	152,040	1,226,917	—158,585
Nevada Northern	165	813,374	78,914	914,072	103,922	115,166	2,383	212,953	26,915	461,342	452,729	.....	47,613	405,116	16,989
New Orleans & Northeastern	399	1,589,649	339,710	2,067,953	204,223	437,834	60,512	778,957	76,418	1,557,947	510,006	—1,505	96,963	411,537	69,587
New Orleans Great Northern	559	692,860	210,797	980,071	132,973	104,141	16,728	279,834	45,381	579,058	401,013	—550	15,002	305,460	100,451
New Orleans, Mobile & Chicago	403	883,789	201,149	1,152,395	157,818	116,386	23,119	357,265	45,462	700,051	452,343	—648	47,574	404,120	—28,165
New Orleans, Texas & Mexico	285	671,498	112,713	830,707	201,719	79,659	19,378	318,253	54,849	673,859	156,847	.....	7,168	149,678	—28,830
New York Central & Hudson River	3,751	35,105,200	19,399,726	61,042,067	9,155,751	11,888,945	1,195,319	21,865,302	1,465,451	45,570,770	15,471,296	—50,777	3,088,541	12,331,977	—2,385,587
New York, Chicago & St. Louis	565	5,082,043	926,045	6,217,822	801,310	906,172	296,575	2,637,956	111,505	4,753,520	1,464,302	—16,195	243,213	1,204,893	—672,033
New York, New Haven & Hartford	2,077	16,810,014	14,775,601	35,122,879	4,505,436	5,010,128	261,287	13,756,099	893,530	24,426,482	10,696,396	50,427	1,830,000	8,916,824	—3,146,082
New York, Ontario & Western	565	3,503,968	1,129,980	4,892,738	767,888	842,673	63,368	1,744,201	100,530	3,518,662	1,374,076	—3,996	113,800	1,256,279	—365,611
New York, Philadelphia & Norfolk	112	1,588,811	293,935	2,019,764	166,523	442,854	33,530	873,911	82,775	1,599,596	420,168	.....	51,000	369,168	—97,843
New York, Susquehanna & Western	152	1,043,573	295,800	1,499,718	201,493	188,892	15,818	617,077	41,260	1,064,542	435,175	—11,648	91,404	332,122	1,107

REVENUES AND EXPENSES OF RAILWAYS

SIX MONTHS ENDING DECEMBER, 1913—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total. inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	General.	Total.					
Norfolk & Western	2,035	$19,888,739	$2,706,948	$23,413,765	$2,830,577	$4,726,867	$369,787	$7,331,980	$458,021	$15,717,234	$7,696,530	—$12,058	$780,000	$6,904,471	—$521,604
Norfolk Southern	569	1,095,793	459,890	1,703,004	218,402	236,939	28,578	548,400	89,758	1,122,079	580,924	—1,221	55,468	524,234	—3,590
Northern Central	472	5,207,736	1,392,114	7,062,892	824,040	1,577,308	110,877	3,341,048	168,026	6,021,301	1,041,591	5,040	264,104	782,527	—415,513
Northern Pacific	6,312	27,629,194	9,035,646	39,045,873	5,336,407	4,518,503	646,428	11,903,291	522,267	22,926,897	16,118,976	275,383	2,170,914	14,223,445	1,397,442
Northwestern Pacific	400	852,519	1,101,042	2,096,106	308,594	243,998	24,311	699,477	72,353	1,348,735	747,371	.....	90,600	656,771	—22,142
Oregon Short Line	2,018	8,939,040	2,794,516	12,475,602	1,481,243	1,438,405	233,845	2,989,639	317,808	6,460,942	6,014,660	—8,172	837,571	5,168,916	—405,545
Oregon-Wash. R. R. & Navigation Co.	1,914	6,206,204	2,791,398	9,645,537	1,448,812	1,095,361	324,868	3,250,699	360,980	6,480,722	2,164,814	—35,023	677,809	245,198	—662,157
Pecos & Northern Texas	481	955,494	254,426	1,278,574	140,419	226,256	16,696	382,936	39,856	806,165	472,408	.....	46,882	425,526	—51,568
Pennsylvania *Company*	1,750	25,840,354	5,511,766	34,712,728	4,906,081	6,371,255	562,297	12,751,409	660,689	25,251,733	9,460,994	—65,500	1,662,475	7,733,019	2,131,039
Pennsylvania *R. R.*	4,043	68,954,455	20,498,804	96,147,405	12,193,877	19,770,490	1,392,637	34,731,697	2,246,297	70,335,000	25,812,404	—942,492	3,781,100	21,088,810	1,161,861
Peoria & Eastern	351	1,213,414	390,253	1,742,355	226,868	359,850	33,870	691,343	35,305	1,347,238	395,117	.....	59,505	335,611	—215,215
Pere Marquette	2,324	5,746,298	2,304,967	8,826,026	1,406,584	2,048,771	205,385	3,701,045	254,128	7,615,915	1,210,110	—27,100	298,788	884,221	—1,015,082
Philadelphia & Reading	1,020	19,788,640	3,818,123	24,752,869	2,599,523	4,465,326	277,647	8,127,981	377,746	15,848,226	8,904,643	125,873	616,342	8,414,174	—2,127,641
Philadelphia, Baltimore & Washington	717	5,363,172	4,393,573	10,838,062	1,706,991	2,002,684	218,647	4,642,246	288,331	8,858,902	1,979,160	.....	332,038	1,647,121	—473,304
Pittsburgh & Lake Erie	223	8,303,560	1,001,490	9,649,093	1,011,653	1,897,965	103,966	2,410,074	174,593	5,598,253	4,050,840	—1,871	368,885	3,680,083	—1,475,224
Pittsburgh, Cincinnati, Chic. & St. Louis	1,472	15,676,433	4,810,322	23,072,190	3,551,660	4,651,362	466,833	8,944,885	463,202	18,077,945	4,994,244	—4,736	982,340	4,007,167	—1,771,780
Pittsburgh, Shawmut & Northern	282	1,042,836	69,498	1,128,421	264,201	301,492	10,763	397,411	31,926	1,005,796	122,625	.....	10,974	111,650	—168,016
Port Reading	21	635,828	.....	644,740	88,839	531	235	190,104	2,523	282,233	362,506	16,158	60,000	318,665	—213,632
Richmond, Fredericksburg & Potomac	87	719,482	477,752	1,372,031	145,167	168,450	18,578	528,265	43,380	903,843	468,188	10,951	49,779	407,457	—71,401
Rutland	468	1,034,839	733,694	2,041,028	230,520	370,887	60,467	748,427	39,810	1,450,114	590,914	643	102,776	488,781	30,100
St. Joseph & Grand Island	318	604,188	195,697	867,403	169,559	128,639	30,354	366,312	38,320	733,186	134,217	65	44,418	89,864	—22,245
St. Louis & San Francisco	4,471	15,390,903	5,881,369	22,862,641	3,344,247	3,585,402	429,295	7,465,075	585,891	15,409,913	7,452,728	.....	733,372	6,719,355	—535,784
St. Louis, Brownsville & Mexico	517	698,957	439,030	1,250,776	287,215	141,324	28,627	465,513	64,141	986,822	263,954	.....	48,728	215,225	—64,127
St. Louis, Iron Mountain & Southern	3,364	12,862,460	3,334,797	17,363,553	2,428,600	2,806,448	320,025	5,150,866	432,811	11,138,752	6,224,800	—16,318	580,260	5,628,221	527,149
St. Louis Merchants' Bridge Terminal	9	.....	2,355	1,013,973	217,533	75,351	4,297	534,021	36,140	867,344	146,629	.....	35,650	110,978	—152,751
St. Louis, San Francisco & Texas	243	582,688	214,998	846,783	147,371	112,921	13,944	309,499	32,775	616,512	230,270	.....	9,660	220,610	9,734
St. Louis Southwestern	905	3,300,483	805,233	4,343,216	397,143	804,836	174,636	1,005,320	161,755	2,543,692	1,799,524	—8,347	181,392	1,609,784	—161,220
St. Louis Southwestern of Texas	810	1,671,280	725,078	2,580,081	573,112	608,826	81,352	990,114	120,648	2,374,053	206,027	—1,671	119,261	85,094	—406,022
San Antonio & Aransas Pass	724	1,768,503	772,819	2,682,702	511,617	384,429	38,224	983,445	70,162	1,987,879	694,823	.....	72,000	622,823	—445,987
San Pedro, Los Angeles & Salt Lake	1,133	3,311,583	1,629,521	5,335,396	653,814	895,326	193,762	1,792,753	110,247	3,645,904	1,689,491	—14,698	233,923	1,440,870	—203,614
Seaboard Air Line	3,081	8,359,834	2,698,913	12,279,669	1,622,938	1,683,046	383,946	4,467,148	370,569	8,527,649	3,752,019	—9,848	492,000	3,250,170	277,720
Southern Kansas of Texas	179	559,852	100,799	692,505	92,813	131,265	9,251	208,901	22,279	464,511	227,993	.....	23,711	204,281	—121,729
Southern Pacific	6,373	29,006,125	16,206,329	48,923,376	5,135,751	6,686,529	953,196	13,489,424	1,413,573	27,678,475	21,244,900	773,947	2,475,301	19,543,547	—2,530,543
Southern Railway	7,036	23,364,578	10,255,502	36,365,254	4,673,314	5,866,054	1,101,471	12,296,968	1,052,626	24,990,435	11,374,819	42,776	1,308,588	10,109,006	—191,408
Southern in Mississippi	280	403,321	238,648	694,556	153,356	65,125	14,192	277,266	24,152	534,093	160,462	.....	54,316	106,146	21,086
Spokane International	163	413,055	140,342	577,906	91,504	32,018	11,837	163,982	22,673	322,016	255,890	.....	22,989	232,900	859
Spokane, Portland & Seattle	556	1,591,699	919,929	2,744,061	372,355	225,130	49,609	652,636	79,486	1,379,217	1,364,843	4,136	320,400	1,048,580	—138,433
Tennessee Central	293	598,337	241,555	888,500	172,856	97,305	34,262	303,050	43,533	651,008	237,491	.....	25,489	212,002	—23,059
Terminal Railroad Assn. of St. Louis	33	.....	1,284	1,474,241	255,817	123,131	5,506	568,007	33,576	986,039	488,202	35,892	172,765	351,329	—172,634
Texas & New Orleans	458	1,349,378	661,427	2,151,538	336,293	500,356	50,054	872,095	78,496	1,837,296	314,242	9,407	119,789	203,860	—64,129
Texas & Pacific	1,844	6,824,041	2,600,856	10,102,702	1,249,500	1,495,573	224,569	3,989,114	254,725	7,213,484	2,889,218	—20,919	358,540	2,509,758	508,234
Toledo & Ohio Central	442	2,722,750	367,174	3,277,470	595,440	650,290	52,268	1,237,093	60,313	2,595,406	682,064	—3,482	128,244	550,337	272,123
Toledo, Peoria & Western	247	398,414	272,709	714,481	146,782	180,226	14,725	305,686	22,159	669,579	44,901	.....	33,600	11,301	—124,326
Toledo, St. Louis & Western	450	2,082,091	210,226	2,434,871	259,247	327,672	97,438	954,240	55,974	1,594,572	840,298	.....	95,800	744,498	152,588
Trinity & Brazos Valley	462	989,303	317,601	1,360,948	323,645	203,901	63,289	619,634	73,730	1,284,201	76,746	.....	36,767	39,979	—363,081
Ulster & Delaware	128	355,316	238,359	625,770	85,994	79,608	9,218	263,068	22,008	459,898	165,872	372	21,000	145,245	—37,260
Union R. R. Co. of Pennsylvania	31	.....	.....	2,564,272	341,970	613,023	612	1,003,470	29,807	1,988,883	575,389	21,334	60,500	536,223	—404,727
Union R. R. Co. of Baltimore	9	727,517	144,014	882,978	65,885	.....	7,621	30,033	15,434	118,975	764,003	.....	35,080	728,922	9,704
Union Pacific	3,611	20,381,605	5,920,176	28,828,630	3,070,599	3,761,424	652,299	7,359,291	755,610	15,599,225	13,229,405	—43,388	1,134,776	12,051,239	—1,124,731
Vandalia	910	4,125,771	1,352,435	6,124,527	781,313	1,125,666	166,146	2,326,565	120,435	4,520,128	1,604,399	.....	187,871	1,416,528	—121,440
Vicksburg, Shreveport & Pacific	171	532,432	324,590	929,682	150,984	176,976	20,999	305,968	31,768	686,696	242,986	—1,508	40,661	200,816	—3,415
Virginia & Southwestern	240	861,222	103,123	991,884	133,065	229,113	13,077	279,221	23,662	678,140	313,744	.....	36,270	277,473	40,546
Virginian	503	3,082,139	215,247	3,382,564	429,565	523,820	33,604	765,391	57,529	1,809,910	1,572,654	44,544	130,145	1,487,053	464,023
Wabash	2,514	10,853,491	4,084,642	16,308,965	2,009,548	2,880,000	542,024	6,438,708	427,844	12,298,125	4,010,839	—27,691	449,160	3,533,988	—464,390
Washington Southern	35	219,269	233,244	615,503	86,925	85,027	7,445	253,633	18,994	452,026	163,477	—972	20,963	141,540	—38,806
West Jersey & Seashore	355	973,058	2,553,803	3,759,070	545,241	570,748	114,974	1,466,474	81,766	2,779,206	979,864	—18,080	155,108	806,675	—204,929
Western Maryland	661	3,503,149	622,469	4,310,543	695,130	688,721	145,388	1,942,324	113,228	3,584,793	725,750	.....	121,500	604,250	—193,951
Western Pacific	936	2,724,749	741,100	3,556,831	719,453	363,287	174,758	1,229,121	165,466	2,652,087	904,743	—10,764	191,568	702,411	—226,147
Western Railway of Alabama	133	429,518	291,071	779,165	129,938	149,225	36,837	209,870	35,578	561,450	217,715	239	29,625	188,329	15,901
Wheeling & Lake Erie	459	3,829,646	355,437	4,484,956	688,273	787,836	50,560	1,416,203	106,312	3,049,186	1,435,770	—703	191,799	1,243,267	—130,598
Yazoo & Mississippi Valley	1,371	4,781,747	1,554,299	6,748,644	945,200	960,184	93,004	2,352,429	162,254	4,513,074	2,235,570	—3,137	258,000	1,974,433	766,353

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission has suspended from April 1 to July 30, an Ohio Electric Railway tariff increasing rates on milk, sweet cream and sour cream.

The commission has suspended from March 26 to July 24, tariffs of F. G. Airy, agent, increasing rates on fruit and vegetables shipped by express in carload lots from points in California to points in Montana.

The commission has suspended from April 1 to July 30, schedules in a Louisville & Nashville tariff increasing rates on lumber in carloads, from certain points in Kentucky on the Louisville & Nashville to Nashville, Tenn.

The commission has suspended from April 1 to July 30, a tariff of W. A. Poteet, agent, increasing class and commodity rates from Chicago, St. Louis and Missouri river points to Salt Lake City, Utah, and other Utah common points.

The commission has suspended from April 1 to July 30, certain schedules in tariffs of W. H. Hosmer, agent, and the Chicago, Burlington & Quincy, increasing from $2 to $3 the charge for stopping cars of cattle, hogs or sheep to finish loading.

The commission has suspended from April 1 to July 30, an item in a tariff of M. P. Washburn, agent, canceling commodity rates on coffee in any quantity, from New Orleans and other points to Jacksonville, Fla.; Charleston, S. C.; Brunswick, Ga., and other points.

The commission has suspended from April 1 to July 30, certain schedules in tariffs of W. H. Hosmer, agent, and the Great Northern, increasing rates on beer and other malt products, in carloads, from La Crosse, Wis., St. Paul, Minn., and other points to certain points in South Dakota and other states.

The commission has suspended to July 30 tariffs of the Atchison, Topeka & Santa Fe, the Chicago & North Western, the Chicago, Burlington & Quincy, the Chicago Great Western, the Chicago, Rock Island & Pacific and other roads, increasing rates on cement in carloads, between points in Illinois, Iowa, Wisconsin and other states.

The commission has further suspended until October 14 tariffs of the Pennsylvania Railroad, the Northern Central, the Philadelphia, Baltimore & Washington, and the West Jersey & Seashore, increasing rates on stone in carloads, from various points located on Pennsylvania Railroad and its connections in Maryland, Pennsylvania and Delaware destined to points in Delaware and Maryland.

The commission has suspended from April 1 to July 30, certain schedules in a Boston & Maine tariff canceling the 6th class rating on bag paper, tag board, binders board, printing paper, in boxes, and certain like commodities in carloads and substituting therefor the 5th class rating as shown in the official classification. This would result in increases of from one to five cents per 100 lb.

The commission has suspended to July 30 certain schedules in tariffs of the Atchison, Topeka & Santa Fe, the Chicago, Burlington & Quincy Railroad Company, the Chicago, Milwaukee & St. Paul and other roads; W. A. Poteet, agent, increasing by from 1 to 5 cents per 100 lb. rates on cattle and sheep, in carloads, from a number of points in western states to the Missouri river, St. Louis, Mo.; St. Paul, Minn.; Chicago, Ill., and a number of other markets.

Rates on Excelsior and Flax Tow from St. Paul

In re the investigation and suspension of advances in rates by carriers for the transportation of excelsior from St. Paul and other points to Chicago and other points. Opinion by the commission:

The commission finds that the carload minimum weight of 20,000 lb. for a 36 ft. car for shipments of excelsior should not be increased because one shipper who owns a certain patented process is able to load more than 30,000 lb. in a 40 ft. car. (29, I. C. C., 640.)

Private Line Tariffs

In re cancellation of rates in connection with small lines by carriers in official classification territory:

The commission has suspended from April 1 to July 30 tariffs of 29 agents and 120 railroads proposing increases in the rates and charges applying from, to, and at stations and industries located on the lines of the following: Chestnut Ridge Railway; Chicago & Illinois Western; Chicago Short Line; Chicago, West Pullman & Southern; Essex Terminal Railway; Genesee & Wyoming; Illinois Northern; Illinois Terminal; Johnstown & Stony Creek; Lakeside & Marblehead; Lowville & Beaver River; Manufacturers' Junction Railway; New Jersey, Indiana & Illinois; Norwood & St. Lawrence; Port Huron Southern; Pullman Railroad; Sheffield & Tionesta; Susquehanna & New York; Tionesta Valley and the Toledo, Angola & Western. The tariffs affecting the railways covered by the *Industrial Railways case* are allowed to stand.

Higher Rates to Fort Scott Upheld

Fort Scott Industrial Association v. St. Louis & San Francisco.

The commission finds that the maintenance of lower rates from St. Louis and East St. Louis to Kansas City than are in effect to Fort Scott, which is intermediate via defendant's line, does not result in discrimination. The defendant is meeting rates at Kansas City over which it has no control. A fourth section application asking that the carriers be allowed to continue to charge higher rates to Fort Scott is therefore allowed. (29, I. C. C., 629.)

Refrigeration Charges on Fruits and Vegetables from Colorado to Kansas Points

Opinion by Commissioner Meyer:

The Missouri Pacific proposes to include in its tariffs relating to the transportation of fruits and vegetables from points in Colorado to points in Kansas a provision which will eliminate an arrangement for furnishing refrigeration, known as shipper's icing, whereby the shipper is allowed to indicate on his bill of lading the amount of ice he desires placed in the car en route, to be furnished by the carrier at $2.50 a ton, and substitute instead a fixed charge of $40 per car. The commission finds that the change will eliminate certain evils of the present system and that the proposed charge of $40 compares favorably with icing charges of other carriers for similar service. (29, I. C. C., 653.)

Rates on Flaxseed from Minneapolis to Fredonia, Kan. and Other Points

Opinion by Commissioner Meyer:

It is proposed to increase the present rate on flaxseed from Minneapolis to Kansas City, Mo., from 10.5 to 16.5 cents, and that to Fredonia, Kan., from 15 to 26.5 cents. The commission taking the ground that the relationship between the rates on flaxseed and those on wheat and other grain should be alike for all points of destination, finds that increases may be allowed to 15.75 cents and 20.5 cents respectively for Kansas City and Fredonia, these rates being the same as apply at the present time on wheat. Rates on flaxseed to other destinations involved, in like manner, should not exceed the rates on wheat to those destinations. These rates in all cases are to be published from Minneapolis proper, as there is no reason for the maintenance of different rates for flaxseed coming from points beyond than from Minneapolis proper. (29, I. C. C., 633.)

Rates on Imported Salts to Cincinnati and Other Points

In re rates on potash and other commodities from North Atlantic seaboard points to Cincinnati, Ohio, and other points. Opinion by the commission:

Imported salts known as kainit, hartsalz, sylvanit, manure salts, double-manure salts, muriate of potash and sulphate of potash, formerly moved from north Atlantic ports to points in central freight association territory under special import rates, the Chicago rate being observed as the minimum as far east as

Cincinnati. On February 1, 1913, these rates were superseded by domestic rates regularly scaled on the percentage basis. It is now proposed to make the present Chicago rate a minimum to apply as far east as Cincinnati. The commission finds that the increased rates which would result are not justified. (29, I. C. C., 626.)

Unreported Opinions

J. G. Kulzer v. Great Northern.

The rates on pine lumber from Kulzer, Wash., to Foxholm, N. D., and Greenwald, Minn., are found reasonable.

Helmers Manufacturing Company v. Chicago, Rock Island & Pacific.

A rate of 18 cents on gum lumber in carloads from Madison, Ark., to Leavenworth, Kan., is not found unreasonable.

National Refining Company v. Atchison, Topeka & Santa Fe.

A rate of 32 cents on petroleum and its products from Coffeyville, Kan., to La Crosse, Wis., is not found unreasonable.

Spring Coal Company v. Norfolk & Western.

The commission does not find unreasonable the demurrage regulations on coal for transshipment by vessel from piers at Norfolk and Lambert Point, Va.

Davis Brothers Lumber Company, Ltd., et al., v. Chicago, Rock Island & Pacific et al.

Rates of 42½ cents and 30 cents on yellow pine lumber from Ansley, La., and Wyatt, La., respectively to Collinsville, Okla., and Ramona, Okla., respectively, are found unreasonable to the extent that they exceed 24 cents. Reparation awarded.

Duvall, Carter & Company v. Southern Railway et al.

The rate on chestnut ties from Fulton Junction, Md., to York, Pa., is found unreasonable in that it exceeds the rate on chestnut lumber. Reparation awarded.

Rates on ice cream.

The commission has set aside a former finding to the effect that ice cream should be carried by express at first class rates, and has decided that it should be considered an article of food and as such, entitled to second class rating.

Rates on canned apples from points in Washington and other states to eastern destinations:

The commission holds that the cancellation of specific commodity rates on canned apples from northern Pacific coast points to eastern territory and the substitution therefor of combination or intermediate rates is not justified. The carriers may establish for the future a rate not in excess of 85 cents per 100 lb.

Straw Rates from Stations in Missouri to Alton, Ill.

Opinion by Commissioner McChord:

The commission finds reasonable a change in tariffs of the Missouri, Kansas & Texas whereby the joint proportional commodity rates on straw in carloads from stations on that road in Missouri to Alton when consigned to Federal shall be canceled. (29, I. C. C., 562.)

The Redemption of Lost Tickets

David E. Miller v. Atlantic Coast Line et al.

The commission finds reasonable a tariff of the defendant providing that it will not redeem any form of passenger transportation which has been mislaid, lost, destroyed or stolen and that requests for redemption of unused passenger tickets will be honored only when such requests are accompanied by the unused transportation. (29, I. C. C., 526.)

Springfield, Mo., Not Discriminated Against

Springfield Traffic Bureau of the Jobbers & Manufacturers Association v. St. Louis & San Francisco et al. Opinion by Commissioner Clark:

It is alleged that the local class rates from St. Louis to Springfield, Mo., applicable as proportions of through rates on traffic from points east of the Indiana-Illinois state line, in central freight association, southeastern, and Carolina territories, are unreasonable as compared to the class rates from St. Louis to Kansas City likewise applicable as proportions of through rates from the same originating territories. The commission finds that the short line competition of the Missouri, Kansas & Texas from St. Louis to Clinton and Harrisonville has resulted in lower rates to Springfield as an intermediate point on the St. Louis & San Francisco than it would otherwise be awarded. Springfield also has the advantage of the same through ocean and rail rates through Birmingham as apply to Kansas City. The rates at issue in the case are, therefore, held to be reasonable and fourth section applications are granted whereby carriers may continue proportional rates from St. Louis to Kansas City via the St. Louis & San Francisco on traffic from the points of origin involved in the case which are lower than the rates on traffic from St. Louis to Springfield. (29 I. C. C., 600.)

Marble Rates from Vermont Points

Opinion by Commissioner McChord:

The commission finds that the Rutland is within its rights in canceling a joint rate on marble from its stations in Vermont to New York routed White Creek, N. Y., to Troy, N. Y., via the Boston & Maine and to New York City via Murray's Line. The Rutland has a joint rate over a route via Chatham and the New York Central, which is as direct and which will give it approximately 59 miles longer haul. (29 I. C. C., 607.)

Storage Rates on Lumber at Camden

Charles K. Parry & Company v. Pennsylvania R. R. Opinion by the commission:

The shipment of lumber in question arrived at Camden on September 18, 1911, but was refused by the person for whom it was placed for delivery. Complainant was notified to that effect on October 13, and further instructions were requested several times following that date. On October 7, 1912, complainant directed that shipment be forwarded to another destination. The lumber meanwhile had been stored at Camden since October 31, 1911, and storage charges amounting to $288 had accrued at the rate of $1 per day for 288 days, excluding Sundays and holidays. The commission finds that this charge was reasonable, even though the defendants have a rule that lumber may be stored in Philadelphia at a charge of $2 per month. (29 I. C. C., 559.)

Rates on Gasolene Engines and Windmills

In re rates on windmills and other articles, including gasolene engines, in mixed carloads from eastern shipping points to points in California and other states. Opinion by Commissioner Clements:

It is proposed to eliminate gasolene engines from mixed shipment with windmills and windmill appliances from points east of the Missouri river to California terminals and intermediate points. Thus at the present time such mixed shipments move from Chicago to the terminals at a commodity rate of $1.40. By the proposed tariffs windmills and windmill appliances may still move at the $1.40 rate, but if gasolene engines are included the class A rate of $1.77 will apply. The carload rate on gasolene engines shipped separately is $1.50. The commission finds the proposed charge reasonable, because the engines are not a necessary part of the windmills. (29, I. C. C., 643.)

STATE COMMISSIONS

The Public Service Commission of Pennsylvania holds that under the law of that state, railroads have no right to grant free or reduced rates to clergymen.

The Public Utilities Commission of Illinois has suspended for 120 days the tariffs filed by the railroads cancelling allowances to industrial roads in the Chicago district on intrastate freight shipments.

The Pennsylvania Railroad has been granted permission by the Pennsylvania Water Supply Commission to build bridges over streams in Venango and Clearfield counties, and to make certain fills along the Allegheny and Kiskiminetas rivers. The Erie Railroad has been authorized to improve Starruca viaduct, near Susquehanna.

The principal railroad companies and the principal express companies operating in Oklahoma have taken action to test in the highest courts the authority of the State Corporation Commis-

sion to order the refund of $6,000,000 by the railroads on account of freight charges declared by the commission to have been too high, and the refund of about $650,000, for a similar reason, by the express companies.

At a hearing before the Louisiana Railroad Commission on March 10, a large number of shippers from all over the state appeared to protest against the new express rates prescribed in the order of the Interstate Commerce Commission, which went into effect both for state and interstate shipments on February 1. The shippers asserted that while the commission's schedule has reduced rates on the smaller packages, the rates on shipments from 50 to 100 lb. have been materially increased.

The State Railway Commission of Nebraska held a hearing at Lincoln on March 24, on the commission's proposed tariff of reduced class rates on freight throughout the state. U. G. Powell, the commission's rate expert, estimated that the proposed reduction would reduce the revenues of the railways in the state by $659,000 a year on state business, and by $450,000 a year on interstate business, which would be affected by the lower state rates.

The Illinois Public Utilities Commission has announced that all public utility companies that have advanced any of their tariffs since July 1, 1913, must now, in accordance with the law under which the commission was created, revert back to their former tariffs until after they have appeared before the commission and have submitted evidence in justification of the advances. The announcement was made because of numerous complaints received by the commission of advances made since the date mentioned.

The Railroad Commission of Louisiana after a hearing orders that all railroads where night trains are scheduled shall maintain switch lights on all main track, yard and terminal switches, and at such other points as may be deemed reasonable and necessary for the safe operation of trains. Where no additional protection is afforded by switch lights or where the same is protected by other standard devices, such as automatic block signals, no lights are required. Switch lights must be kept lighted from sunset to sunrise.

The Pennsylvania Public Service Commission, after hearing the complaints of short railroads and of shippers in the region of Pittsburgh relative to new freight tariffs filed by the Pennsylvania, the Baltimore & Ohio and the Pittsburgh & Lake Erie, withdrawing the allowances on through rates which for years had been granted to the short lines, has notified the larger roads named, and all roads, that existing rates must not be changed except on 30 days' notice to the commission. Representatives of the United States Steel Corporation and other large mill interests said that if the proposed changes should prevail it would be a severe blow to them.

PERSONNEL OF COMMISSIONS

Charles N. Hebner has been appointed secretary of the Illinois Public Utilities Commission.

C. H. Gerber, chief engineer of the Nebraska State Railway Commission, has resigned to go into other business, the resignation to take effect about May 1. Mr. Gerber expects to join the engineering firm of Hurd, Gerber & Wettling.

Coleman J. Joyce, of Pittsburgh, has been appointed chief of the bureau of accounts of the Pennsylvania Public Service Commission. Mr. Joyce has been auditor of the Montour Railroad Company and was formerly assistant to the controller of the Pittsburgh Coal Company.

C. W. Pifer, consulting engineer at Dubuque, Ia., and formerly connected with the engineering department of the Illinois Central in various capacities, has been appointed senior civil engineer for the Central District, Division of Valuation, Interstate Commerce Commission, with headquarters at Chicago.

Hon. Nathaniel Ewing, chairman of the Pennsylvania State Public Service Commission, died at Uniontown, Pa., March 28, at the age of 65. Mr. Ewing had been a lawyer and a judge for many years, and was appointed chairman of the first state railroad commission in Pennsylvania, in 1907.

O. P. B. Jacobson has been appointed a member of the State Railroad and Warehouse Commission of Minnesota in place of Charles F. Staples. Mr. Staples has been appointed a member of the advisory board of the division of valuation of the Interstate Commerce Commission.

George M. S. Schulz, a city magistrate in the borough of the Bronx, has been appointed a member of the New York State Public Service Commission, First district, in place of John E. Eustis. Mr. Schulz is 43 years old and a Democrat. He was a member of the lower house of the legislature in 1906 and 1907; and in 1908 was a member of the state senate.

B. C. Milner, Sr., of Louisville, Ky., has been appointed senior civil engineer, Southern District, Department of Valuation, Interstate Commerce Commission, with headquarters at Chattanooga, Tenn. Mr. Milner is head of the contracting firm of B. C. Milner Sons Company. In 1907 he resigned as division superintendent of the Southern Railway to become general manager and chief engineer of the Cumberland Railroad.

William T. Emmet has been appointed by the governor of New York a member of the Public Service Commission, Second district, in place of James E. Sague, whose term has expired. Professor Frank Irvine of Cornell University has been appointed a member of the Public Service Commission, Second district, in place of C. N. Douglas. The Public Service Commission of the Second district now consists of Seymour van Santvoord, chairman; Martin S. Decker, DeVoe P. Hodson, William T. Emmet and Frank Irvine.

Frank Irvine, whose appointment is noted above, has been Dean of the faculty of law at Cornell University, Ithaca, N. Y., since 1907, and has been a professor in that institution since 1901. Mr. Irvine is 55 years old, and for many years lived in Nebraska. He was a judge in that state in 1891-93.

COURT NEWS

In the United States District Court at Danville, Ill., the Grand Trunk Railway has pleaded guilty to charges of accepting and receiving concessions in freight rates and conspiracy to violate the interstate commerce law, and was fined $1,000 each on five counts by Judge F. M. Wright. The Grand Trunk was jointly indicted with the Cleveland, Cincinnati, Chicago & St. Louis and the Chicago, Indiana & Southern railroads and the O'Gara Coal Company, the charges growing out of shipments of coal by the latter company from southern Illinois mines.

Hours of Service Law

The United States Circuit Court of Appeals, ninth circuit, in a decision by Judge Morrow, holds that a fireman who remains on duty over 16 hours, without reasonable excuse, is working contrary to law even though the time after the end of the 16th hour is occupied in watching an engine which stands idle on a side track. The decision affirms a fine of $100 imposed on the Great Northern Railway by the District Court, for Idaho.

A fireman, Burgen, was on a freight train at Laclede, Idaho, July 10, 1912, which had been on the road 16 hours, and was tied up. This was at 10 p. m. The rest of the crew went to sleep on the train, but the fireman was assigned to watch the engine and to keep up the fire so that the engine could at any time proceed with its train on short notice. The company claims that during this time—from 10 p. m. until 6 a. m. the next day—the fireman was not on duty, in the sense contemplated by the hours of service law, and was not "engaged in or connected with the movement of any train" within the meaning of the statute. But the court holds that the train in this situation was substantially subject to the same conditions as though it were on any other side track in the ordinary course of a trip; and that as the fireman had to watch the fire and the water his duties were not much different from those of a fireman on a moving train. Moreover, the law applies to "any employee" engaged in or connected with the movement of a train; it is not limited to men performing particular duties. If Burgen had been employed as a watchman during the entire period of 24 hours, such employment would have constituted a violation of the act.

Railway Officers

Executive, Financial, Legal and Accounting

S. H. West, general attorney of the St. Louis Southwestern, has been appointed general solicitor, with headquarters at St. Louis, Mo., effective March 24.

J. H. P. Hughart, vice-president and general manager of the Grand Rapids & Indiana, with office at Grand Rapids, Mich., has been elected president. See Operating for other changes on the Pennsylvania Lines West of Pittsburgh.

Joseph Baldwin Hutchinson, assistant to vice-president in charge of real estate purchases and insurance of the Pennsylvania Railroad, with office at Philadelphia, Pa., was retired on April 1 under the pension rules of the company, having reached the age of 70.

H. O. Dunkle, general manager of the Chicago Terminal division of the Erie, with office at Chicago, has been appointed assistant to president in addition to his other duties. A photograph of Mr. Dunkle and a sketch of his railway career were published in the *Railway Age Gazette*, of January 17, 1913, page 127.

W. L. Seddon, assistant to the president of the Seaboard Air Line at Norfolk, Va., has been appointed first assistant to president, and H. W. Stanley, general manager at Portsmouth, has been appointed second assistant to the president, both with headquarters at Norfolk. A portrait of Mr. Seddon and a sketch of his railway career were published in the *Railway Age Gazette* of January 10, 1913, page 81, and a portrait and sketch of Mr. Stanley were published on May 30, 1913, page 1201.

John G. Walber, assistant to third vice-president of the Baltimore & Ohio, with office at Baltimore, Md., has resigned and has been appointed secretary of the newly organized Bureau of Information of the Eastern Railways, with office at New York City. Mr. Walber began railway work in 1885 as a clerk on the Ohio & Mississippi; the following year he was made clerk in the office of the president and general manager, and when that road became a part of the Baltimore & Ohio system he was appointed private secretary to the second vice-president and traffic manager at St. Louis. In March, 1896, he was promoted to chief clerk in the office of the vice-president and general manager at Cincinnati, and subsequently was appointed assistant general manager. He was then transferred to Baltimore as general superintendent of transportation, and later was appointed assistant general manager. In December, 1912, he was promoted to assistant to third vice-president and was made head of the department in charge of matters concerning discipline of all employees in the operating branch, with authority over the Baltimore & Ohio, the Baltimore & Ohio Southwestern, the Cincinnati, Hamilton & Dayton, and the Staten Island Lines, with headquarters at Baltimore.

J. G. Walber

Operating

F. A. Rutherford has been appointed trainmaster of District 26 of the Grand Trunk, with headquarters at Battle Creek, Mich., succeeding Robert Kelley, transferred.

C. S. Lake has been appointed general superintendent of the Seaboard Air Line, with headquarters at Portsmouth, Va., and the office of general manager has been abolished. See Executive, Financial, Legal and Accounting.

H. T. Malcolmson, superintendent of car service of the Toronto, Hamilton & Buffalo, at Hamilton, Ont., has been appointed superintendent, succeeding R. A. Barrett resigned, and A. E. Lock has been appointed car accountant, both with offices at Hamilton, Ont.

Herbert E. Correll, whose appointment as superintendent of the St. Louis division of the Chicago, Rock Island & Pacific, with headquarters at Eldon, Mo., has already been announced in these columns, was born at Madison, Wis., in 1866. He received a high school education and began railway work in 1882 with the Chicago, Milwaukee & St. Paul, where he was employed successively as operator, brakeman and conductor until 1888, when he was made assistant train despatcher at Chicago. He was promoted to chief despatcher in 1891, and became trainmaster in 1894, leaving that road to go to the Elgin, Joliet & Eastern in 1905 as assistant superintendent at South Chicago. He resigned in 1908 to go to the St. Louis, Iron Mountain & Southern as trainmaster of the Illinois division, and three years later he was appointed trainmaster of the St. Louis division of the Chicago, Rock Island & Pacific. The latter position he held until March 1, when he was promoted to the superintendency of the St. Louis division, with office at Eldon, Mo., as above noted.

H. E. Correll

Edward Fuller Brooks, general superintendent of the Philadelphia, Baltimore & Washington, at Wilmington, Del., was retired under the pension rules of the company on April 1. He was born on September 30, 1848, in Cumberland county, N. J., and in 1872 graduated from Rutgers College. He entered the service of the Pennsylvania Railroad in August, 1872, as assistant in the office of the assistant engineer of the New York division, and from 1878 to 1880, was supervisor of that division. In 1880 he was appointed assistant engineer of the Middle division on the Philadelphia & Erie division, and from 1883 to 1893 he was engineer of maintenance of way of the United Railroads of New Jersey. From May 1, 1891, to 1892, he was also acting superintendent of the New York division. He was appointed superintendent of the Maryland division of the Philadelphia, Wilmington & Baltimore in 1893. After two years there he was then, until 1899, superintendent of the New York division. Since that time he has been general superintendent of the Philadelphia, Wilmington & Baltimore, and its successor, the Philadelphia, Baltimore & Washington. Mr. Brooks' entire service has been with the Pennsylvania.

P. C. Allen, who has been on the staff of the superintendent of transportation of the Baltimore & Ohio, since March 1, last, has been appointed superintendent of the Philadelphia division, with headquarters at Philadelphia, Pa., succeeding J. T. Olhausen, assigned to other duties. Mr. Allen was born on December 20, 1869, at Rock Island, Ill., and was educated in the public schools. He began railway work as office boy on the Atchison, Topeka & Santa Fe, and from 1889 to 1901, served in the mechanical, traffic and operating departments of that road, consecutively as clerk, agent and trainmaster. He then went to the Chicago Great Western and was engaged on terminal work until 1902. From 1904 to 1913 he was consecutively assistant superintendent and superintendent on the Great Northern. On March 1, 1914, he entered the service of the Baltimore & Ohio, on the staff of the superintendent of transportation, and now becomes superintendent of the Philadelphia division of the same road, as above noted.

R. Stephens, superintendent of the Wichita Terminal Association of Wichita, Kan., has been appointed also superintendent of the Wichita Union Terminal Railway Company, in charge of the new union station and elevated track terminals at Wichita. He was born in Missouri, and commenced railway work in 1893 as a telegraph operator for the Chicago, Rock Island & Pacific at Goodland, Kan. Subsequently he was agent and yardmaster at various points until 1906, when he became vice-president and general manager of the Chickasha Light, Heat & Power Company. He returned to railway work in March, 1908, as traveling auditor for the Panama Railroad, with headquarters at Colon, and later had charge of the deepwater terminals at Colon. From April to November, 1909, he was district sales agent for the McAlester Fuel Company, and from the latter date to January, 1910, was in the construction department of the Wichita Falls & Northwestern. He was then appointed superintendent of the Wichita Terminal Association, a joint switching facility serving the packing house, stock yards and elevator and milling district of Wichita, which position he still retains in addition to his new duties as superintendent of the new passenger terminals at Wichita, as above noted.

R. Stephens

Elisha Lee, assistant to the general manager of the Pennsylvania Railroad, at Philadelphia, Pa., has been appointed general superintendent of the Philadelphia, Baltimore & Washington, with office at Wilmington, Del., succeeding E. F. Brooks, retired. Mr. Lee was born on September 24, 1870, at Chicago, and graduated from the Massachusetts Institute of Technology in the class of 1892. He entered the service of the Pennsylvania Railroad in November of the same year, as a rodman in the office of the division engineer on the Tyrone division. From August, 1895, to October, 1897, he was on leave of absence. In April, 1899, he was appointed assistant supervisor, and two years later was promoted to supervisor. In August, 1903, he was appointed assistant engineer in the maintenance of way department, and in April, 1907, was promoted to principal assistant engineer on the Philadelphia, Baltimore & Washington. On March 24, 1909, he was appointed superintendent of the New York, Philadelphia & Norfolk, and two years later was promoted to assistant to the general manager of the Pennsylvania Railroad Lines East of Pittsburgh, Pa., and Erie. During the last year and a half, Mr. Lee has been chairman of the Conference Committee of Managers of the eastern railroads. In that capacity he has had personal charge on behalf of the railroads interested of the negotiations with the various railroad labor organizations, and the presentation of the railroads' case in the arbitration of wage demands of the firemen and trainmen and conductors.

Elisha Lee

New appointments on the Pennsylvania Lines West of Pittsburgh have been made as follows: W. B. Wood, superintendent of the Eastern division of the Pittsburgh, Fort Wayne & Chicago at Pittsburgh, Pa., has been appointed general manager of the Grand Rapids & Indiana, with headquarters at Grand Rapids, Mich.; F. J. Kron, superintendent of the Logansport division of the Pittsburgh, Cincinnati, Chicago & St. Louis at Logansport, Ind., succeeds Mr. Wood; R. K. Rochester, superintendent of the Peoria division of the Vandalia at Decatur, Ill., succeeds Mr. Kron, and J. F. Patterson, trainmaster of the Western division of the Pittsburgh, Fort Wayne & Chicago at Ft. Wayne, Ind., succeeds Mr. Rochester.

J. H. O'Neill, assistant general superintendent of the Western district of the Great Northern, with headquarters at Spokane, Wash., has been appointed general superintendent of the Western district, with office at Seattle, Wash., succeeding J. Russell, resigned to accept service with another company. C. E. Leverich, assistant general superintendent of the Eastern district at St. Paul, Minn., succeeds Mr. O'Neill at Spokane. L. W. Bowen, superintendent of the Spokane division, with headquarters at Spokane, takes the place of Mr. Leverich at St. Paul, and George S. Stewart succeeds Mr. Bowen. W. Carswell has been appointed superintendent of the Marcus division, with office at Marcus, Wash., in place of J. M. Doyle, who succeeds George S. Stewart as superintendent of the Montana division, with headquarters at Havre, Mont. J. H. Hicken has been appointed trainmaster on the Montana division, with office at Havre, to succeed W. Carswell. Nile Shaw has been appointed trainmaster on the Kalispell division, with headquarters at Whitefish, Mont., vice W. R. Benedict, resigned. T. B. Degnan, superintendent of terminals at Seattle, who has reported to the superintendent of the Cascade division, will hereafter have exclusive charge of terminals at Seattle and Tacoma, and will report direct to the general superintendent. Effective April 1.

Traffic

M. L. Schultz has been appointed commercial agent of the Louisiana & Arkansas at Chicago.

F. E. Godfrey has been appointed assistant general freight agent of the Tennessee Central, with headquarters at Nashville, Tenn.

Randolph Daniels, chief clerk to the general passenger and ticket agent of the Missouri, Kansas & Texas of Texas at Dallas, Tex., has been appointed assistant general passenger agent at Dallas.

Thomas G. Smiley, freight traffic manager of the Western Maryland at Baltimore, Md., having resigned, his former position has been abolished and the duties heretofore performed by Mr. Smiley have been assumed by D. G. Gray, general freight agent at Baltimore.

H. R. Bingham has been appointed general agent, passenger department, of the Denver & Rio Grande, Western Pacific, Missouri Pacific and St. Louis, Iron Mountain & Southern, at Los Angeles, Cal., to succeed C. P. Ensign, resigned to engage in other business, effective April 1.

H. G. Benedict, commercial agent of the Atlanta, Birmingham & Atlantic at Kansas City, Mo., has been appointed general eastern agent, with headquarters at New York City, succeeding R. W. Crowell, resigned, and John A. Groves, traveling freight agent at Kansas City, succeeds Mr. Benedict.

C. B. Sudborough, division freight agent of the Vandalia at St. Louis, Mo., has been appointed assistant general freight agent at St. Louis, succeeding H. R. Griswold. B. H. Dally, division freight agent at South Bend, Ind., succeeds Mr. Sudborough, and F. S. Montgomery takes the place of Mr. Dally.

Engineering and Rolling Stock

J. S. Sheafe, engineer of tests of the Illinois Central, has been appointed master mechanic of the Staten Island lines of the Baltimore & Ohio, with headquarters at St. George, Staten Island, N. Y.

T. M. Ramsdell has resigned as master car builder of the Chicago & Alton, to become master car builder of the Oregon-Washington Railroad & Navigation Company, with headquarters at Portland, Ore., effective April 15.

R. C. White, general roadmaster of the Southern district of the Missouri Pacific-Iron Mountain system at Wynne, Ark., has been appointed engineer maintenance of way of that district, with headquarters at Little Rock, Ark., succeeding H. E. Hale, resigned.

D. J. Mullen, assistant to the superintendent of motive power of the Cleveland, Cincinnati, Chicago & St. Louis, has been appointed superintendent of motive power, with headquarters at Indianapolis, Ind., succeeding S. K. Dickerson, resigned. F. K. Murphy, master mechanic at Beech Grove, Ind., succeeds Mr Mullen, and M. K. Tate, assistant master mechanic at Bellefontaine, Ohio, takes the place of Mr. Murphy.

F. L. Thompson, engineer of construction of the Illinois Central, has been appointed assistant chief engineer, succeeding D. J. Brumley, who has been appointed valuation engineer; A. F. Blaess, district engineer at Chicago, has been appointed engineer maintenance of way, and P. Laden has been appointed district engineer of the northern lines; all with headquarters at Chicago. Mr. Laden was formerly a division superintendent of the Illinois Central and has recently been engaged in special work on the Grand Trunk. A photo and sketch of Mr. Thompson were published in the *Railway Age Gazette* for April 25, 1913, page 972; a sketch of Mr. Blaess appeared in the issue of October 17, page 724, and of Mr. Brumley in the issue of April 18, 1913, page 923.

W. E. Ricketson, who has been appointed mechanical engineer of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Beech Grove, Ind., as has already been announced in these columns, was graduated from Cornell University in 1907, with degree of M. E. He began railway work in 1903 with the Delaware & Hudson Company, for which company he worked during his summer vacations while attending college. From 1907 to 1910 he was special apprentice with the Lake Shore & Michigan Southern, and the following two years successively was roundhouse foreman of the Lake Erie, Alliance & Wheeling at Alliance, Ohio, and the Lake Shore & Michigan Southern at Ashtabula. He was then general foreman of the latter road at Youngstown, Ohio, until September, 1913, when he was appointed assistant mechanical engineer of the Cleveland, Cincinnati, Chicago & St. Louis, which position he held at the time of his promotion to mechanical engineer on March 1, as above noted.

Christian S. Heritage, whose appointment as engineer of the Washington Terminal Company, with office at Washington, D. C., has been announced in these columns, was born on September 15, 1873, at Glassboro, N. J. He graduated from Princeton College in 1896, with the degree of civil engineer, and in July of that year entered the service of the Pennsylvania Railroad in the engineering department. In March, 1900, he was appointed assistant supervisor on the Amboy division, and was later transferred in the same capacity to the Maryland division, becoming supervisor on the Shamokin division in November, 1902, at Shamokin, Pa. He was subsequently transferred as supervisor, first to Irvona, and later, to Blairsville. From August, 1907, to the following December, he was with the Carnegie Steel Company in the track appliance department, and then became supervisor of the Washington Terminal Company at Washington, D. C., which position he held at the time of his recent appointment as engineer of the same company as above noted.

Charles F. Barnhill, whose appointment as division master mechanic of the Gulf, Colorado & Santa Fe, with headquarters at Silsbee, Tex., has already been announced in these columns, was born December 26, 1872, at McArthur, Ohio. He was educated in the common schools, and began railway work in October, 1886, with the Ohio Southern, as a machinist apprentice at Springfield, Ohio. After completing his apprenticeship in November, 1891, he was employed as machinist at the Lagonda shop at Springfield for seven months, when he went to the Chesapeake & Ohio as machinist at Clifton Forge, Va. From February, 1893, to November, 1898, he was successively machine foreman, erecting foreman and general foreman at Clifton Forge, and the following two years was erecting foreman at Huntington, W. Va. In November, 1900, he went to the Columbus, Shawnee & Hocking as machinist at Columbus, O., and from July, 1901, to December, 1902, was machine and erecting foreman at that place. Mr. Barnhill then became connected with the Gulf, Colorado & Santa Fe as erecting foreman at Cleburne, Tex. In May, 1904, he was made roundhouse foreman at that place, and in March, 1907, was promoted to division foreman at Gainesville, Tex., which position he held at the time of his appointment as master mechanic of the Beaumont division on March 1, as above noted.

J. B. Berry has resigned as assistant to the president of the Chicago, Rock Island & Pacific, with office at Chicago, effective on April 1. It is expected that he will engage in private practice as consulting engineer, with office at Chicago, specializing on valuation of railway properties, examinations and reports, and studies of operating economics. Mr. Berry was for 20 years on the Chicago & North Western Railway System in various positions in the engineering department, the last five years as chief engineer of the lines west of the Missouri river. In 1898 he went to the Union Pacific as chief engineer, with headquarters at Omaha, Neb., when E. H. Harriman and H. G. Burt were put in active charge of the property, and he was chief engineer of that road for nearly eight years, during which time the road was rehabilitated and reconstructed and a number of new lines that have since been built were developed. A portion of this time he was also consulting engineer of the Oregon Short Line and acted in an advisory capacity on the Oregon Railroad & Navigation Company. In 1905 Mr. Berry left the Union Pacific to become chief engineer of the Chicago, Rock Island & Pacific, which position he held until April 1, 1913, when he was appointed assistant to the president. While he was chief engineer of the Rock Island, in addition to the usual duties of that office, he organized a force for valuation purposes and made reports to seven different states. As assistant to the president during the past year he has also been in charge of valuation work, especially in connection with the requirements of the federal valuation. For nearly a year he has been one of the committee of 15 engineers representing the carriers of the United States in dealing with the Interstate Commerce Commission Board of Engineers, for the purpose of adopting basic principles governing the federal valuation.

Hugh E. Hale, engineer of maintenance, Southern district of the Missouri Pacific-Iron Mountain system, with office at Little Rock, Ark., has been appointed engineer for the Presidents' Committee on Valuation, Eastern group, with office at New York. He was born on April 8, 1874, in Minnesota, and was educated at Lehigh University, and in 1891 began railway work as a rodman on the Pennsylvania Railroad. From April, 1898, to February, 1901, he was assistant supervisor, and then was supervisor of signals of the same road at Camden, N. J. From March to May, 1902, he was assistant engineer of the Baltimore & Ohio and then was appointed division engineer at Philadelphia, Pa., of the same road. He was promoted to superintendent at Butler, Pa., in December, 1903; from September of the following year to June, 1905, he was division engineer at Baltimore, and then to June, 1908, was engineer of maintenance of way of the same road at Baltimore. He then went to the Missouri Pacific as assistant engineer at St. Louis, Mo. From September, 1909, to April, 1910, he was engineer of design on the same road, and was promoted in April, 1910, to principal assistant engineer at the same place; since August, 1911, he has been engineer of maintenance, Southern district of the same road, with headquarters at Little Rock, Ark.

H. E. Hale

Purchasing

W. P. Hickey has been appointed division storekeeper of the New York Central & Hudson River, with office at Oswego, N. Y., succeeding J. F. Wallace.

OBITUARY

William Kline, formerly superintendent of telegraph of the Lake Shore & Michigan Southern, at Toledo, Ohio, died in that city on March 19, at the age of 78. He was born at Albany, N. Y. After leaving school he became a messenger in Buffalo, and later entered the service of the Southern Michigan & Northern Indiana at Adrian, Mich., afterwards becoming chief operator. On the consolidation of the various independent railroads into the Lake Shore & Michigan Southern, Mr. Kline was appointed superintendent of telegraph with headquarters at Toledo. He retired from this position about four years ago.

James L. Frazier, civil engineer, formerly connected with the engineering and operating departments of the Chesapeake & Ohio, Southern Pacific, Toledo, St. Louis & Western and other lines, died in Rome, Italy, on February 28. Mr. Frazier was born at Staunton, Va., in June, 1849, and was educated at Washington and Lee University, and the University of Virginia, graduating from the latter school in civil engineering. He was engaged on the Cincinnati Southern during its entire construction, having charge of the bridges on that line; later he was in charge of bridges on the Louisville, Evansville & St. Louis, now the Southern, and was in Mexico on the lines of the Mexican National Railways. He was at one time a director of the American Society of Civil Engineers. He was division engineer, and later chief engineer and general superintendent of the Chesapeake & Ohio at Louisville, Ky., for a number of years. Following this he served as superintendent of several of the divisions of the Southern Pacific. He resigned from the Southern Pacific to become general superintendent of the Toledo, St. Louis & Western, later leaving that company to become general manager of the California Northwestern and the North Shore, at San Francisco. While with the latter company, his health became permanently impaired following a serious illness, and he retired from active work in 1905, since which his time has been spent partly in this country, but principally in Europe. He was a man of strong character and held in high esteem by a large circle of his acquaintances.

John Nicholson Faithorn, formerly president and general manager of the Chicago Terminal Transfer, died at the University Hospital, Chicago, March 28, aged 62 years. He was born in London, England, and began railway work in February, 1873, with the Chicago & Alton as entry clerk. He was successively clerk, general freight agent's secretary and chief clerk in general freight office of that road until September, 1882, when he became auditor of the Southwestern Railway Association. From May, 1885, to April, 1887, he was commissioner of the Western Freight Association and the Northwestern Freight Association, and from the latter date to October, 1890, was successively commissioner of the Western & Northwestern Railway Freight Bureau and chairman of the Western Freight Association. He was then chairman of the Southwestern Railway & Steamship Association and commissioner of the Western Freight Association at St. Louis, Mo., and from January, 1893, to December, 1898, was vice-president and general manager of Street's Western Stable Car Company at Chicago. During 1895 and 1896 he was also general manager of the Wisconsin & Michigan Railway. He became president and general manager of the St. Louis, Peoria & Northern in December, 1898, which position he held until the company ceased operating in December, 1899. In August, 1899, Mr. Faithorn was elected president and general manager of the Chicago Terminal Transfer, and later was appointed receiver, resigning in 1910. He also was vice-president of the Chicago & Alton in charge of traffic from July, 1902, to December, 1904. Mr. Faithorn at the time of his death was president of the Faithorn Company, printers, of Chicago.

Pullman Cars for Scotland.—The directors of the Caledonian Railway of Scotland have decided to introduce Pullman car service on several of the company's lines, and cars are now being built to the order of the Pullman Company, Limited, by a Sheffield firm. Dining and parlor cars will be run from Glasgow to Aberdeen, and buffet cars between Glasgow and Edinburgh and to the residential districts, such as the Strathearn district of Perthshire, etc. It is also proposed to run a buffet-observation car during the summer between Glasgow and Oban.

Equipment and Supplies

LOCOMOTIVE BUILDING

The Bangor & Aroostook is reported to be preparing plans for 2 mikado type locomotives.

The Delta Land & Timber Company, Kansas City, Mo., has ordered one mikado type locomotive from the Baldwin Locomotive Works.

The Union Pacific has ordered 25 Pacific, 15 mikado and 14 six-wheel switching locomotives from Lima Locomotive Corporation. The Pacific type locomotives will have 25 by 28 in. cylinders, 77 in. driving wheels, a weight on the latter of 167,000 lb., a total weight in working order of 278,000 lb., and a tractive effort of 38,636 lb. The mikado type locomotives will have 26 by 28 in. cylinders, 63 in. driving wheels, a weight on the latter of 214,000 lb., a total weight in working order of 286,000 lb., and a tractive effort of 51,075 lb. The six-wheel switching locomotives will have 19 by 26 in. cylinders, 51 in. driving wheels, a total weight in working order of 154,000 lb., and a tractive effort of 27,376 lb. Of the 25 Pacific type locomotives, 20 will be used by the Union Pacific and 5 by the Oregon Short Line. All of the mikado type locomotives will be used in passenger service on the Union Pacific. Of the 14 six-wheel switching locomotives, 5 will be used by the Union Pacific, 5 by the Oregon Short Line and 4 by the Oregon-Washington Railroad & Navigation Company. Two of the last 4 will be fitted for oil burning. All of the 54 locomotives will be equipped with superheaters.

CAR BUILDING

The Great Northern is in the market for 1,000 refrigerator cars.

The Chicago, Milwaukee & St. Paul is figuring on a number of passenger cars.

The New York Central & Hudson River is reported to have withdrawn its recent inquiries for freight cars.

The Illinois Central has ordered 500 box cars for the Central of Georgia from the Standard Steel Car Company.

The Mooney Biscuit & Candy Company, Ltd., Montreal, Can., is in the market for a number of second hand cars.

The Philadelphia & Reading is said to have dropped its inquiry for 1,000 hopper cars, noted in the *Railway Age Gazette* of February 20.

The Southern has ordered 5 combination baggage and mail and 5 combination passenger and baggage cars from the American Car & Foundry Company, and 35 coaches and 5 combination passenger and baggage cars from the Pressed Steel Car Company.

IRON AND STEEL

The Minneapolis, St. Paul & Sault Ste. Marie has ordered 3,000 tons of rail from the Illinois Steel Company.

The St. Louis & San Francisco has ordered 6,000 tons of rail from the Tennessee Coal, Iron & Railroad Company.

SIGNALING

The Southern Railway is to install automatic block signals on 150 miles of double track as follows: Amherst to Whittles, Va., 57.3 miles; Atlanta to New Holland, Ga., 53.46 miles; Howell (Atlanta) to Austell, Ga., 15.5 miles; Citico (Chattanooga) to Ooltewah, Tenn., 13.4 miles; and Danville, Va., to Pelham, N. C., 9.3 miles. The signals will be upper quadrant, three-position. With the completion of these installations the Southern will have equipped practically all its double track lines with automatic signals.

Supply Trade News

The Dieter Nut Company, New York, has moved its offices from 84 William street to 80 Maiden Lane.

C. H. Bull has been appointed manager of the railway motor car department of the Buda Company, of Chicago, with office at Harvey, Ill.

The Joyce-Watkins Company, railway ties, Chicago, Ill., has removed its office from 134 South La Salle street to the McCormick building, 332 South Michigan avenue.

The New York Cement Gun Company, New York City, announces that its cement gun for concrete work, which has heretofore been leased to railroad and industrial incorporations, is now for sale outright.

The Roberts & Schaefer Company, Chicago, has been awarded a contract by the Elgin, Joliet & Eastern for a two-track 300-ton capacity, reinforced concrete, counterbalanced bucket, locomotive coaling station for installation at Dyer, Ind., to replace the wooden structure recently destroyed by fire. The contract price is approximately $13,600.

The A. S. Cameron Steam Pump Works, New York, announces the opening of a branch office and warehouse in each of the following cities, in several of which the company is already represented by agencies: Birmingham, Ala.; Chicago; Cleveland, Ohio; Duluth, Minn.; Houghton, Mich.; Knoxville, Tenn.; Los Angeles, Cal.; Philadelphia, Pa.; Pittsburgh, Pa.; St. Louis, Mo.; Seattle, Wash.

TRADE PUBLICATIONS

Oilstone Grinders.—The Mummert-Dixon Company, Hanover, Pa., has recently issued catalog No. 5 describing in detail its line of Mummert-Dixon oilstone grinders.

Weed Burners.—The Lamb Railway Service Company, Cincinnati, Ohio, has recently issued a booklet showing views and giving a description of the Lamb Weed Burner.

Locomotive Cranes.—The McMyler Interstate Company, Cleveland, Ohio, has issued bulletin No. 30, describing and illustrating the company's type "J" standard gage locomotive crane.

Silent Chain Transmission.—The Link-Belt Company, Chicago, has recently issued Data Book No. 125 on the subject of Link Belt Silent Chain. It is in the form of a well printed booklet of 112 pages bound in a flexible red cover, and gives a detailed description of the product with which it deals, showing its advantages for many kinds of installations. The various silent chain accessories are likewise described. The value of the book lies in its tables. These include tables of ratios, speeds, horse power, etc., and others giving the means for figuring the length of chain required and the like. By means of them one should be able to figure out a particular drive and to select the size of chain and wheels suitable for the work to be done. List prices and discounts which are given should enable him to determine the cost.

Automatic Signals and Signal Appliances.—The General Railway Signal Company, Rochester, N. Y., has recently issued pamphlet No. 2,019, describing the G. R. S. model 2A Signal. The booklet contains a description of the apparatus; information relative to its installation, maintenance and operation; diagrams showing dimensions and clearances of the high and dwarf signal mechanism; diagrams showing R. S. A. standard foundations, signalmasts, semaphore spectacles, signal blades and torque curves, and a number of typical circuit diagrams for interlocking, alternating currents and direct currents for interlocking signals. The company has also issued bulletin No. 115 C describing and illustrating the same signal in a less technical way. Other bulletins also recently issued are: No. 106 A entitled The G. R. S. Improved Lightning Arrester, Model 1 C, and No. 130 describing the G. R. S. EZ motion plate rail clips and R. S. A. detector bars.

Railway Construction

Baltimore & Virginia.—An officer writes that preliminary surveys are now being made on the remaining section of about 25 miles between Millersville, Md., and Drum Point. The company started work some time ago on a line from Baltimore, Md., south through Anne Arundel and Calvert counties to Drum Point on the Patuxent river, about 70 miles. In addition to the use of steam as the motive power, gasolene motor cars will be used. D. B. Stewart, vice-president; J. C. Leib, secretary, both of Baltimore, and B. Watkins, Chesterfield; J. C. Webster, Solomons, Md., and W. H. Stewart, New York, are directors.

Baraboo, Devils Lake & Western.—An officer writes that the company plans to build from either Cashton or La Crosse, Wis., southeast via Baraboo and a number of small towns to Portage, about 100 miles. On about 50 miles the work will be heavy. Contracts for carrying out the work will not be let until next year. The company will use both steam and electricity for the motive power. T. F. Resley, president, and T. E. Meade, general manager and chief engineer, Baraboo.

Canadian Pacific.—The Railway Commission of Canada has approved the revised location of the main line, as at present constructed on the Thomson sub-division, from mileage 24.76, at Savona, B. C., to mileage 30, and from mileage 32 to 40.62, at Semlin; and authorized the construction of an additional track (double track) on said revision; also, subject to an inspection by the department of public works for B. C., the construction of this additional track across four highways.

Carbon & Stillwater (Electric).—Incorporated in Montana with $750,000 capital to build an interurban line between Red Lodge, Mont., and Columbus, 40 miles. The incorporators and directors include W. Larkin, Red Lodge; J. Herington, Stillwater; W. H. Reber, Absarokee; C. W. Selleck, Roscoe and J. Shaw, Luther.

Central of New Jersey.—We are told that the Easton & Western has been incorporated to build a switching branch from Glendon, a suburb of Easton, Pa., into the manufacturing district of Easton, about four miles. The line may not be built until 1915 or 1916.

Easton & Western.—See Central of New Jersey.

Fairmount & Veblen.—An officer writes that contracts will be let in about 30 days to build an extension from Veblen, S. Dak., southwest to Webster, about 40 miles. The maximum grades will be 2 per cent., and the maximum curvature 2 deg. About three miles of the work will be heavy. The company finished work last year on the line from Veblen, S. Dak., northeast to Fairmount, N. Dak., 50 miles. Julius Rosholt, president, and J. H. Thomas, chief engineer, Veblen, S. Dak. (March 13, p. 555.)

Fredonia & Reeves.—See Illinois Central.

Great Northern.—An officer writes regarding the report that a branch is to be built from a point south of Scobey, Mont., to a point in the Fort Peck Indian Reservation, that it is not likely that such a line will be built in the near future.

Illinois Central.—The Fredonia & Reeves has been incorporated in Illinois to build from Fredonia, Ill., on the Illinois Central in Williamson county to a point on the Johnston City branch of the same road. The line will be used almost exclusively for coal traffic.

Kansas Roads (Electric).—Announcement is made that the United States Sugar & Land Company, Garden City, Kan., will build an interurban line connecting its ranches near Garden City.

Louisburg & Rocky Mount.—We are told that this company plans to build from Louisburg, N. C., southeast via Mapeville, Stallings, Castalia and Red Oak to Rocky Mount, about 40 miles, and that the prospects for building the line are good. It has not yet been decided when contracts will be let for the work. The company expects to develop a traffic in lumber, cotton and tobacco. James A. Turner, mayor of Louisburg; F. B. McKinne and S. A. Newell of the Chamber of Commerce, are interested.

Louisiana Roads.—According to press reports, the Tioga Gravel Company, Alexandria, La., will build a 10 mile line from its gravel pit to Alexandria. G. K. Force, treasurer, and I. L. Thomas, superintendent, Alexandria.

New York Subways.—The New York Public Service Commission, First district, has received bids for the construction of section No. 1-A of route No. 12. This is the first section of the Eastern Parkway subway, in Flatbush avenue, between St. Marks avenue and the Prospect Park plaza, borough of Brooklyn; the contract will probably be let soon. The Cranford Company, Brooklyn, was the lowest bidder at $2,225,520. (March 6, p. 492.)

North Louisiana (Electric).—According to press reports financial arrangements have been made to build the line from Shreveport, La., east via Minden, Homer and Arizona to Monroe, about 110 miles. A. B. Blevins, president, Jefferson. (September 19, 1913, p. 541.)

Olathe, Winfield & Arkansas City (Electric).—Incorporated in Kansas, with headquarters at Winfield, to build from Olathe, Kan., southwest to Arkansas City. The incorporators include W. A. Powell, F. A. Nichol, Enid, Okla.; P. E. Wiles, Lamont, Okla.; W. H. Perry and C. M. Wallace, Winfield, Kan.

San Antonio, Uvalde & Gulf.—An officer writes that the location survey for a line into Aransas Pass, Tex., will be started in the near future. The company finished the extension southeast to Corpus Christi, on February 27, and train service is now in operation. (October 31, p. 844.)

San Francisco & Northern (Electric).—This is to be the new name of the Petaluma & Santa Rosa, which operates about 43 miles of electric lines out of Petaluma, Cal. The reorganized company plans to build an extension north to Healdsburg.

Shelbyville, Mattoon, Pana & Hillsboro Traction.—This company has a capital of $250,000, and plans to build an electric line, it is said, from Hillsboro, Ill., where a connection is to be made with the McKinley system northeast to Charleston, about 80 miles. R. Johns, president; W. Penwell and J. Orr are directors, Pana.

Texas & Pacific.—This company has under consideration the question of building an extension into the De Soto oil field of Louisiana. An investigation of the traffic possibilities of the new field has been made, and surveys for a line into the field will be made at once. Two routes are under consideration, one east from the main line at South Mansfield, La., and the other west from the Natchitoches branch at Grand Bayou, La.

Tucson & Phoenix Tidewater.—Organized at Phoenix, Ariz., to build from Phoenix west to San Diego, Cal., about 350 miles. James Douglas, Jr., Douglas, Ariz., is interested.

RAILWAY STRUCTURES

Chicago, Ill.—The Illinois Public Utilities Commission has approved an ordinance recently passed by the city council providing for the vacation of certain streets and alleys required for the continuation of the work on the new clearing classification yards and buildings of the Belt Railway of Chicago. Work on the reconstruction of the yards, which was begun last year, will be resumed in a few days.

Freeport, Tex.—We are told that bids were recently asked for the construction of the piers and superstructure of the combined railroad and county bridge, to be built jointly by the Houston & Brazos Valley and Brazoria county over the Brazos river to connect Velasco and Freeport. Work on staking out the approaches and pier sites was started on March 23. (January 30, p. 254.)

Inglewood, Ont.—The Railway Commission of Canada has authorized the Grand Trunk to construct a bridge at mileage 48.25, over Credit river, near Inglewood, Ont.

Montreal, Que.—The Railway Commission of Canada has authorized the Grand Trunk to re-construct nine bridges on the Fourth district, in the province of Quebec.

Wilkinsburg, Pa.—An officer of the Pennsylvania Railroad writes that tentative plans have been prepared for a new station at Wilkinsburg.

Railway Financial News

Atlanta, Birmingham & Atlantic.—The general protective committee of obligations and stock has adopted a plan of reorganization and made arrangements with Kidder, Peabody & Company to act as bankers and underwriters.

The first mortgage of the Atlantic & Birmingham Railway, under which $4,090,000 bonds are outstanding, is to remain undisturbed, and the property of the Atlanta, Birmingham & Atlantic will be acquired subject to this mortgage. A new company will be organized called the Georgia, Alabama & Western Railroad, with the following capitalization: $3,000,000 first and general mortgage thirty-year 5 per cent. bonds, $400,000 equipment trust notes, $3,200,000 5 per cent. noncumulative preferred stock, $27,000,000 common stock.

Holders of Atlanta, Birmingham & Atlantic first mortgage bonds for each $1,000 bond held may subscribe for $160 preferred stock and $1,000 common stock, par value, for $160 in cash. Holders of the first collateral trust 5 per cent. notes of the A., B. & A. for each $1,000 note held may subscribe for $134.89 preferred and $843.05 common, par value, of the new company, for $134.89 cash. First mortgage 5 per cent. bondholders of Georgia Terminal Company per $1,000 bond held, may subscribe for $160 preferred and $1,150 common, for $160. First mortgage 5 per cent. bondholders of the Alabama Terminal may subscribe for $160 preferred and $1,000 common, for $160. Holders of 6 per cent. bonds of Fitzgerald, Ocilla & Broxton, if acquired, will receive $700, par value, common stock for each $1,000 bond.

Holders of receivers' certificates will receive in payment of principal 40 per cent. in bonds of the new company at 90 and 60 per cent. in cash.

The general committee will be allotted $1,815,000 common stock, which will be used as far as possible to pay expenses, including their own compensation. Kidder, Peabody & Company will receive as underwriting commission $110,000 in cash and $5,000,000 par value common stock.

Boston & Maine.—The stockholders, at a meeting held on March 30, approved by a vote of 222,675 to 562 the plan of the directors to sell the road's interest in the Maine Central to the Maine Railways Companies, consisting of interests connected with the latter road. The Boston & Maine will receive $95 each for its 159,601 shares, a total of $15,201,995. The Maine Railways Companies will issue $3,000,000 stock, all of which is to go to the Maine Central, which will issue against it $3,000,000 30-day promissory notes, to be turned over to the Boston & Maine. The remainder will be paid in the form of $12,201,995 of 5-year notes of the Maine Railways Companies. Maine Central stockholders on March 31 also voted in favor of the plan. (March 20, 1914, page 704.)

Chicago & Eastern Illinois.—The protective committee representing the refunding and improvement 4 per cent. mortgage bonds, due July 1, 1955, is asking for deposits of these bonds with the United States Mortgage & Trust Company, the aim being to secure unified action and protection for the holders in the existing receivership proceedings.

National Railways of Mexico.—The company has arranged to meet the interest on its general mortgage bonds and the consolidated 4 per cent. bonds of the National Railroad of Mexico due April 1 by offering 3-year 6 per cent. notes, guaranteed by deposit of Mexican government 6 per cent. 10-year treasury bonds of 1913.

New York Connecting.—Application has been made to the Public Service Commission for authority to issue $5,000,000 first mortgage gold bonds in addition to $11,000,000 already issued and sold. The new bonds will run 40 years and are to be sold at par. They will be redeemable on any interest day, at 105.

Norfolk & Western.—Brown Brothers & Co. have sold at par and interest $10,000,000 4½ per cent. gold equipment trust certificates, Series of 1914, maturing $500,000 semi-annually, beginning February 1, 1915, and ending August 1, 1924.